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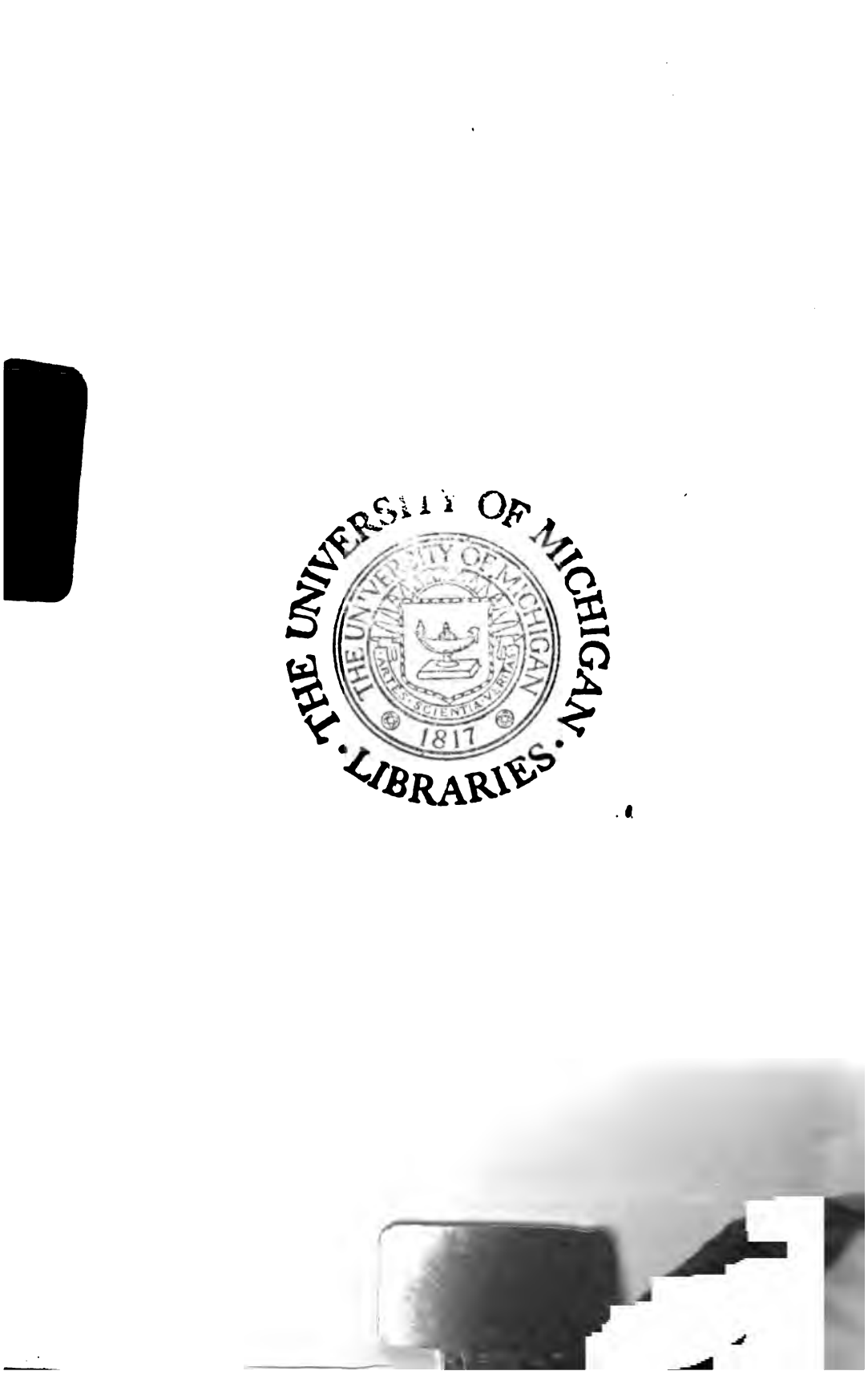

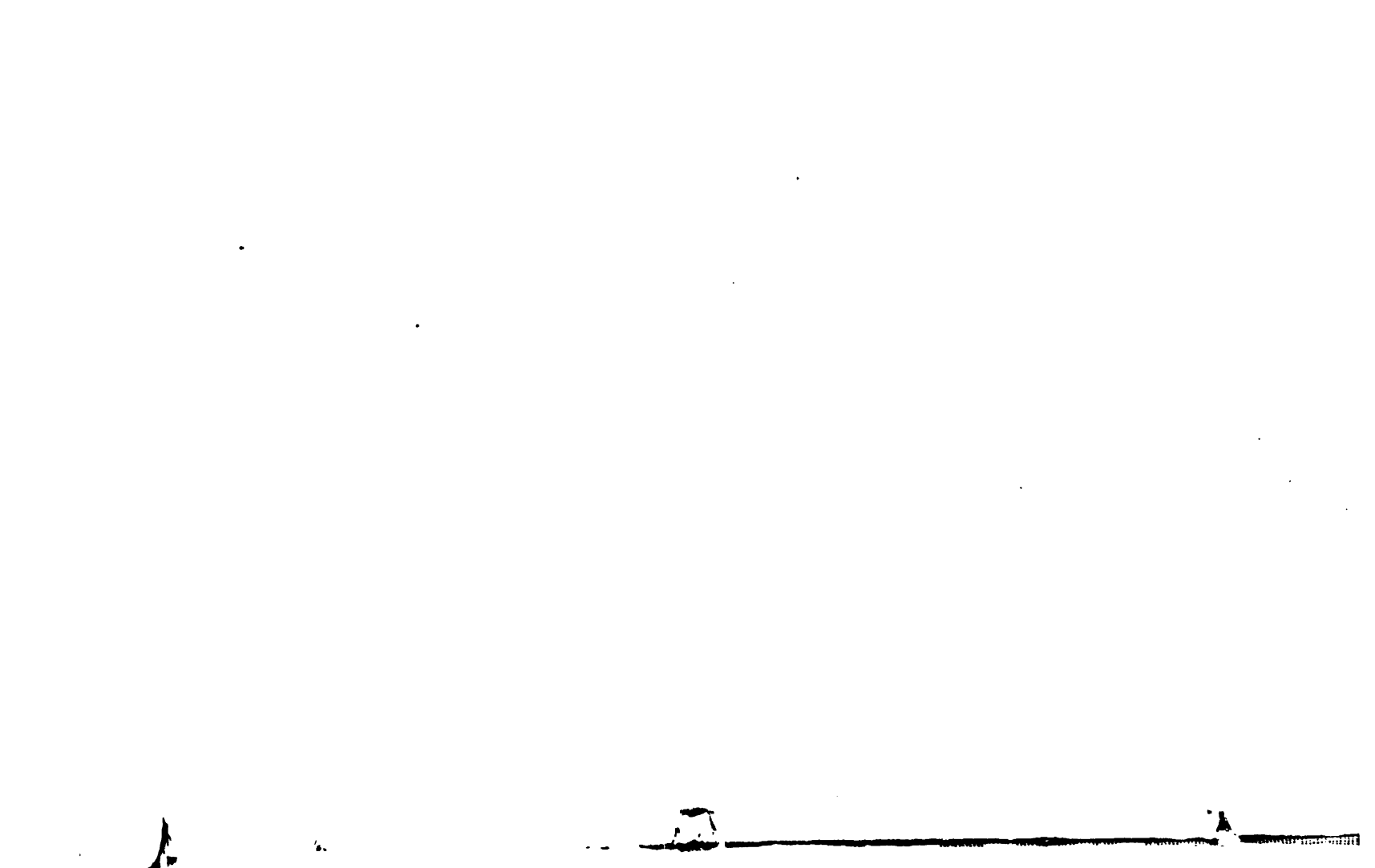

BIOGRAPHICAL RECORD

OF THE

OFFICERS AND GRADUATES

OF THE

Rensselaer Polytechnic Institute,

1824-1886.

EDITED BY

HENRY B. NASON,

SECRETARY OF THE ASSOCIATION OF GRADUATES, 1872—1886.

WITH AN INTRODUCTION

BY

BENJAMIN H. HALL.

TROY, N. Y.:
WILLIAM H. YOUNG.
1887.

UNIV. OF MICH.

Yours affectly
J Montgomery

...mic Institute,

...

...

...

ADDITIONS AND CORRECTIONS.

Page 11, line 18, for $200,000 read $267,000.
" 32, " 38, for man read men.
" 37, " 11, for resided read now resides.
" 41, " 30, add, died in New York city August 10th, 1886.
" 48, " 2, add, Vice-president 1869–72.
" 49, " 10, add, acting president August 10th, 1886, till time of decease, January 10th, 1887.
" 54, " 22, after W. H. Doughty, insert C. E., class of 1858.
" 90, " 17, before Warren insert M.
" 108, " 35, for 1866 read 1868.
" 122, " 27, for instructive read instinctive.
" 128, " 21, for Hamill read Hammell.
" 129, " 24, for companies read compasses.
" 138, " 19, for Hamill read Hammell.
" 146, " 12, after Montreal add, and same degree was conferred by Harvard College at 200th anniversary, 1886.
" 149, " 20, for Hawaian read Hawaiian.
" 158, " 14, for three read four.
" 162, " 15, insert, resigned 1886, and elected professor of physics, Adelbert College, Cleveland, Ohio.
" 202, 2, for Courtland read Cortland.
" 214, " 15, add, deceased November 28th, 1886.
" 233, " 36, for surveyor read engraver.
" 265, between lines 33 and 34, insert Class of 1847.
" 314, line 30, for Cincinnati, O., read Pittsburgh, Pa.
" 356, " 19, for Mannela read Manuela.
" 420, " 1, for M. read Martin.
" 430, " 7, read C. E., after Graham Macfarlane.
" 511, " 7, for William read Allen.
" 522, " 29, address, Great Barrington, Mass.
" 554, " 37, omit *
" 585, " 18, for Warren read Walter.

PREFACE.

This "Biographical Record of the Officers and Graduates of the Rensselaer Polytechnic Institute" was authorized by the Association of Graduates, at their annual meeting in 1873, at which time it was supposed that the work could be finished for the Semi-Centennial Celebration in June, 1874.

The gathering of the desired information was immediately commenced, circulars sent to all living graduates and to relatives of the deceased, but during the year less than one hundred answers were received. The interest seemed so small, and the labor so great, that nothing more was done for nearly ten years. In January, 1883, the work was resumed, and circulars again sent out. A few answered promptly, and offered assistance, while others required several circulars and letters before they replied. Postmasters, clergymen, and persons known to be interested in genealogy were addressed; the directories of cities, the records of towns and villages, the catalogues of other institutions, the publications of scientific societies, were searched; and monuments, tablets and headstones examined. Whenever any trace of an individual was found, it was followed until the desired information was obtained, or further effort seemed to be of no avail. Only a very few have been found who were unwilling to furnish information concerning themselves or others, the larger number having manifested great interest by rendering all aid possible.

A serious difficulty arose at the beginning of the work from the fact that all the records of the Institute were destroyed in the great fire of 1862, and the impossibility of completing the list of annual registers. On this account, errors may be found,

and possibly some names have been entirely omitted. Mistakes may also have been made on account of the difficulty in deciphering hastily written records, the peculiar forms of letters and figures, and the copying of thousands of names and a larger number of dates. Corrections of errors in these records and catalogue, and new information, are earnestly desired, and if received will be carefully preserved for future use.

Nearly all the time that could be spared from other duties during the past three years has been devoted to this work. In the compilation of these records, it has been a great pleasure to form the acquaintance of the graduates of the Institute of the first thirty years, and to exchange friendly greetings with those of the last thirty years, with whom it was the privilege of the editor to be associated during their student life.

In giving the various records, the following order has been observed: Name in full, personal history before entering the Institute, date of entrance, professional life and work, books or pamphlets written, honorary degrees received, membership of societies, marriage and number of children, date of death of deceased, present post-office address of the living. If the place of residence at the time of entrance was different from the place of birth, the name is inserted in parenthesis. An effort has been made to make the reports as brief as possible, giving the simple facts without comment.

The catalogue of non-graduates, which follows the biographical records, is of much interest, showing that the Institute has been useful to many who did not complete the course. Some entered only for special work, and others, for various reasons, were obliged to relinquish the course. Many of these, however, have attained to high positions in professional and business pursuits.

In conclusion, thanks are due to all graduates who have so generously given assistance, and especially to Prof. James Hall, class of 1832; to Prof. George H. Cook, class of 1839,

and to J. Francis Williams, class of 1883. Also to Benjamin H. Hall, of Troy, N. Y., for valuable suggestions, and for the introduction, which he has kindly consented to furnish for this volume.

Obligation is acknowledged for facts and some notices from the valuable "History of Rensselaer County," by N. B. Sylvester, from "Contemporary Biography of New York," and from the "History of Troy," by A. J. Weise.

Finally, the editor trusts this book of records will be of interest to all graduates and friends of the Institute; that it may increase and strengthen the ties which bind them to it, and that this pioneer scientific school will ever maintain its present high position, and continue to send out, in all time to come, men fully equipped for the great work of life, thus realizing the brightest hopes of its founder and patron, and of all those who have so faithfully labored to strengthen its foundations and increase its usefulness.

RENSSELAER POLYTECHNIC INSTITUTE,
January 1st, 1887.

HENRY B. NASON.

SUMMARY.

Whole number of Trustees, 1824 to 1887	116
Elected	92
Ex officio	24
Number January, 1887	24
Whole number of Faculty and Instructors	112
Professors and Assistant Professors	44
Instructors and Assistants	68
Professors, January, 1887	10
Instructors and Assistants, January, 1887	7
Whole number of Students, 1824 to 1887	2,502
Number of Graduates	900
Number of Graduates deceased	154
Number of Non-Graduates	1,602
Graduates from the United States	838
" " foreign countries	62

The graduates of the Institute have engaged in the following professions and occupations:

Civil Engineers	346
Mining Engineers	36
Mechanical Engineers	11
Manufacturers	58
Iron or Steel Manufacturers	24
Merchants	71
Professors or Instructors	42
Physicians	25
Lawyers	17
Agriculturists or Planters	19
Bankers or Capitalists	14
Chemists	12
Architects	7
Geologists	4
Clergymen	6
Editors	3
Publishers	3
Not classified	202

INTRODUCTION.

The place which a work like this volume occupies in the world of letters has long since ceased to be anomalous. The characteristics of such a record, though mainly those which appertain to a collection of data made on certain lines of research, are thoroughly biographical, and to some extent historical. The folios of Anthony Wood, the historiographer of the University of Oxford, are repositories of valuable information, and have served to arouse in others that spirit which tends to preserve, for the benefit of mankind, an account of those whose lives have been examples worthy of imitation, or to be avoided. Early in the history of this country was preserved the record of the lives of the civil and ecclesiastical founders of some of our commonwealths, as it appears on the pages of Cotton Mather's Magnalia Christi Americana. Painstaking fidelity in research and a conscientious regard for the preservation of memoranda of those who have been connected with our academical institutions, are evidenced, in these later years, in volumes whose value is deservedly acknowledged. Of such works no better examples can be mentioned than Sibley's Biographical Sketches of Graduates of Harvard University, Palmer's Necrology of Alumni of Harvard College, Williams Biographical Annals, by Durfee, and the Biographical Record of the Alumni of Amherst College, by Montague and others. To this list the present volume is now added.

The writer of these lives of those who have taught and been taught in, and who have had the direction and management of the affairs of the Rensselaer Polytechnic Institute, as he reviews the pages he has prepared, can alone estimate the time and labor he has expended upon them. It may seem to many a small matter to have written this volume. Such persons, however, if they give the subject any thought, must view the volume as a whole, but do not appreciate the number and

character of the details of which it is formed. It is comparatively an easy task to write the life of one whose deeds have became the common property of his fellows; but when attention is drawn to the lives of obscurer yet worthy men, the task becomes more difficult. Often a dispute arises as to a date, and the settlement of this point may involve an examination stretching out into months and resulting in a voluminous correspondence. Then, as frequently happens, there are some who are sensitive in regard to the publication of the facts of their lives. If the biographer presents a sketch of the career of such persons he offends them, and if he fails to make such a presentation, he is pronounced by his readers as incompetent for the task he has undertaken.

In perusing these pages it must be remembered that they cover a record of sixty-two years, and that the materials of which they are composed have been gathered, mainly, by the efforts of one man. Every living graduate who could be reached has been asked to contribute the main facts of his life, and information has been sought respecting those graduates who are dead, from surviving relatives or friends. Errors, doubtless, will be found in the volume, but it is believed that most of them are immaterial, or are such as will be readily detected and corrected by the careful reader. The praise due Dr. Nason for the service he has rendered the Institute, in this publication, has been earned by most earnest and devoted labor. His investigations have been carried on while engaged in performing the routine duties pertaining to his position as professor of chemistry in the Institute, and while attending to the multifarious calls made upon him as a scientist. He has received assistance, varying in value, from friends who have appreciated the difficulties of the task in which he has been engaged, but the labor of compiling, arranging and completing the items of information he has gathered from many sources has fallen on him alone.

The members of a school of learning bear to each other, in certain ways, a relation similar to that which exists between the members of a family. When one member of an honored school of learning endeavors, as in the case now presented, to collect and arrange and publish an account of the lives and acts of his fellows, the result of his undertaking should be received with that appreciation which follows when one member

of some distinguished family records, in lasting and truthful words, the history of his kindred. With feelings of this nature, every true son of the "Rensselaer," and every one connected with her management and teaching, will peruse this volume, while those of us who are only the well-wishers and favorers of this renowned mother of scientific learning, will unite with them in congratulations that the story of their lives, and of the lives of their brethren who have finished their course on earth, has been so well and so carefully told in these pages.

There may be some who are not acquainted with the character of the teaching that obtained at the "Rensselaer School" at its inception. To such, a few words on this subject may be both interesting and suggestive. In point of time of organization, the Institute occupies the first place among the scientific seminaries of this country, and it is second to none in the results it has accomplished in its special lines of investigation, when these results are measured by the work which has been done by its graduates. To those who, as teachers, at different times, during the last sixty-two years, have labored to impart instruction in the various departments committed to their trust, are due praise and honor for the good work they accomplished. To one man of them all, however, must be accorded praise and honor the greatest. Amos Eaton stands out as the prominent, central figure from whom emanated the strong, positive and practical character which has entered into the work of this pioneer school. Personally, he was the embodiment of rugged manliness, and physically the repository of great strength and endurance. Practical results were the aim of his investigations, of his studies, of his teachings. He desired to benefit his race. He sought to make easier the condition of the farmer, of the mechanic, and of those whose work is to struggle with the brute forces and products of nature.

The benefits he was eager to bestow were not those of the mere visionary or enthusiast, who looks, with seemingly prophetic eye, to a far off future of alleviation. The relief he desired to give was to be immediate, effective, tangible. This underlying principle of his whole career as a teacher, found expression in his first published work, a little treatise entitled "Art without Science," which appeared in the year 1800. In this composition, and to a great extent in the forty-four or more

works from his pen that followed it, truth was investigated primarily in the realm of art for the sake of production, and only incidentally in the realm of science for the sake of knowledge. When, in the year 1810, Eaton formed, at Catskill, in this state, what the learned Dr. Hosack called "the Botanical Institution," he prepared, for the use of his pupils, a small elementary compilation on botany. Referring, many years after, to this occasion, he said: "I made then the first attempt in this country at a popular course of lectures, with a view to make practical botanists of young persons of all conditions and pursuits."

The first edition of Eaton's "Index to the Geology of the Northern States" appeared in the year 1818. This was an elucidation of the geology of portions of the states of New York, Massachusetts, Connecticut and Vermont, and "was the first attempt at a general arrangement of geological strata in North America." In collecting data for this work he travelled more than a thousand miles on foot. The frankness with which he stated his positions and the personal character of his observations, as presented in this work, aroused the attention of the public and won the praise of learned men. His methods of investigation were approved, and one reviewer of his statements declared, that "by such accurate observations and zealous exertions, the science of practical geology can be successfully cultivated, and can attain all the certainty of which it is capable." When, two years later, Eaton published the second edition of the "Index," he stated that his journeys on foot, while in search of geological facts, exceeded, at that time, two thousand miles, leaving out of the account his excursions in the vicinity of Troy and Albany and more than a thousand miles of "carriage and water travelling." In the preface of the second edition he alluded with great respect, and by name, to the American geologists who, at that time, had made large collections of minerals, or had taught the science of geology with success. Of himself he wrote, in these words of modest import: "But the drudgery of climbing cliffs and descending into fissures and caverns, and of traversing, in all directions, over most rugged mountainous districts, to ascertain the distinctive characters, numbers and order of our strata, has devolved on me. I make no pretensions to any peculiar qualifications, other than that bodily health and

constitutional fitness for labor and fatigue, which such an employment requires."

These facts in the life of Eaton, manifested at periods antedating the formation of the Institute, showing, as they do, his character as a student of the mysteries of nature and as a teacher of what he had learned of her secrets, are interesting, not only as evidence of his capacity for the position he was to be called on by Stephen Van Rensselaer to assume, but also of the practical ideas which Mr. Van Rensselaer desired to have taught, inasmuch as he was thoroughly conversant with the modes of thought and action which were Eaton's peculiar possession.

When Eaton published the second edition of his "Index," he was forty-four years old. The practical spirit within him was a part of himself. If it was not born in him, it had become his second nature, and when, in 1825, he took charge of the "Rensselaer School" as senior professor, he did so fully imbued with the conviction that his duty was to make practical men of those entrusted to his tutelage and teaching. This conviction remained with him as the guide of his life's work, and with it he imbued not only his pupils but those associated with him in teaching. The example thus presented, punctuated as it was by the strong, native, intellectual power which inhered in Eaton, permeated and became a forming force in the Institute. The senior professors and directors who have followed him as the heads of the Institute in instruction, have ever sought for practical results in their administration of affairs. Such were the aims of Cook, B. F. Greene, Beman, Drowne and Adams, and such for the last eight years has been, and is now, the object to the attainment of which have been devoted the energy and ability of the present head of instruction, Director D. M. Greene.

The interest which the citizens of Troy have always taken in the success of the Institute ought not to pass unnoticed. Often in its history when, owing to some unforeseen circumstance, the means for the successful prosecution of its work have been curtailed, voluntary subscriptions varying in amount, but in the aggregate sufficient, have borne testimony to the devotion of those within whose borders this school of science had its birth. It may seem invidious where many have done so much, to single out individual instances of well-doing, but a reference to some

of the instances in which benefactions have been made to the Institute, may serve to direct attention to certain ones of its needs, for the supply of which intermittent provision is, at present, its only reliance.

On September 24th, 1875, as Williams Proudfit, of Troy, a member of the class which graduated in 1877, was driving on Second street in that city, his horse became frightened and unmanageable, and he was thrown from his wagon. Striking the pavement with great force he received internal injuries, from the effects of which he died on the following day. He was born on November 30th, 1856, was an only son, and his young life ended just as it had begun to develop those characteristics which betoken a manly nature and are prophetic of a useful career. On November 6th, 1875, his parents, Ebenezer Proudfit and Margaret E. Proudfit, in a letter dated at Troy, addressed to the trustees of the Institute, proposed to erect, at their own expense, a suitable structure for an astronomical observatory, on land to be provided by the Institute, in memory of their son and to be called after his name. The proposition was received with favor by the trustees, and in their letter of November 10th, 1875, they notified to the generous donors their acceptance of the gift as "not only a valuable contribution to science and learning, but also an appropriate memorial to their lamented son."

The rearing of this structure was commenced soon after, and the Williams Proudfit Observatory has, for a number of years, been one of the most prominent of the Institute buildings. Though admirably located and firmly founded architecturally, it has not yet received that equipment which is needed to bring into practice its work as a means of education. Is it too much to hope, that the time is not far distant, when, by the aid of appropriate instruments within these well-constructed walls, a clearer view shall be had of those worlds revolving in space, whose mysteries and glories, we believe, are now fully revealed to the purified vision of him in whose memory this Observatory crowns the adjacent hills?

By the will of Lewis L. Southwick, which was admitted to probate June 4th, 1878, the Institute received the sum of two thousand dollars for the general purposes of the corporation. Mr. Southwick was born in Troy, August 19th, 1819, and died

in that city March 5th, 1878. He was a member of the Institute in 1834.

Henry P. Filer was born in Troy, on October 13th, 1805, and was the son of Zephaniah Filer, who was a resident of Troy as early as 1795, and was the first librarian of the old Troy Library at its inception in the year 1800. The education of young Filer was such only as was obtainable previous to the introduction of our public system of teaching, and probably ended when he was fifteen or sixteen years old. Soon after, he began to learn the trade of a silversmith, with James Young, in Troy. He subsequently engaged in the tailoring business with his father, and later on with a brother. In this latter occupation he continued until 1846, when he was made Librarian of the Troy Young Men's Association, and served with great faithfulness, in that capacity, until 1864. He then became the clerk of the Troy Cemetery Association, and for several years administered that department of its affairs committed to his care with marked fidelity and correctness. His eyesight having become much weakened, he retired from business, and in May, 1876, removed to Cambridge, in this state, where he passed the remainder of his days, and where he died on May 11th, 1884.

At Christmas in the year 1882, by a paper which he styled an agreement, and which bore date at that day, he gave to the Institute ten thousand dollars in money, on condition that that corporation should pay to him quarterly, during his natural life, the sum of one hundred and fifty dollars. This gift was accepted on the terms proposed, the acceptance being in the form of an instrument in writing, dated also at Christmas. At a meeting of the trustees of the Institute, held March 27th, 1883, they, in appropriate memoranda, which were made a part of their records and were also addressed to Mr. Filer, manifested their appreciation of his generous act, and declared their "desire to enter upon their minutes and to express to Mr. Filer their deep sense of thankfulness and obligation to him for this great aid to the Institute, and to the cause of science and learning as cultivated in this school, and also to express the hope that his honorable and useful life may be prolonged in health and happiness, to reap the reward of good deeds done to his fellow-men."

The life of Mr. Filer was not passed amid the glare and splen-

dor of the world, nor was it surrounded with the pomp and circumstance which pertain to men high in official or affluent station. On the contrary, quietly and unobtrusively, but faithfully and diligently, he performed whatever work he was called on to do, and dignified by conscientious service every position he filled. At the same time, his habits of observation were ever wakeful, and careful and long-continued attention to the facts and events connected with the educational interests of the city, ended in the formation of a judgment, consequent upon which came the gift, the full benefit of which the Institute will always enjoy. In his honor let it be remembered that, as he neared the end of a toilsome, modest, honest, honorable life, he devoted a large share of the accumulations which were the result of years of self-denial, rectitude, diligence, and temperance in all things, to he education of young men and to the development of scientific knowledge.

The William Howard Hart professorship of rational and technical mechanics is the only fully endowed professorship of the Institute. William Howard Hart, the eldest son of Richard P. Hart, who was one of the original trustees of the Institute, was born in Troy on November 7th, 1820, and received his youthful education in that city, in Danbury, Conn., in the city of New York and at the village of Chambly in Canada. He passed seyeral years in foreign travel and in journeys through the middle and western states of this country, and in the year 1844, soon after the death of his father, commenced his career in connection with business enterprises, and as the chief adviser concerning the large estates whose management gradually came, in great measure, to be confided to his care and judgment. Although following no special profession, his life was, in every sense, a busy one. His tastes in study were essentially philosophical, but as his early education had not been formed on any particular plan, and had been desultory rather than defined, and owing, in part, to the uncertain condition of his health, did not include a collegiate or scientific training, he found himself, later on in life, not only an inquirer in the realms of scientific and academic knowledge, but also a student of the technical nomenclature of the departments of learning with which he desired to become familiar. He delighted to follow the lucubrations of Huxley, and regarded Haeckel and Charles Robert Darwin as

among the foremost of the original scientific investigators and thinkers of the world.

His residence, during nearly the whole of the last twenty-five years of his life, was in the country. Opportunities were thus afforded for open air exercise, and for a long time his health improved as the result of the recreation and employment which he found in the development of the grounds which surrounded his beautiful dwelling. He was acquainted with the name and habit of every plant and shrub and tree that grew on his place, either normally or as an exotic. The birds and insects also came under his inspection, and his examination of the nature and acts of the latter opened for him a field of investigation limitless in extent and suggestiveness. He was familiar with the use of the microscope, and was specially interested in the results developed by its manifestations in the studies which he pursued by its aid. Historical topics afforded him much pleasure, and he evinced peculiar delight in locating, on the field where a battle had been fought or some other transaction of moment had occurred, the positions and the movements of those engaged in such battle or transaction, and the situation of any constructions, now obliterated, that had been of importance on the past occasion.

His death occurred at his residence — Fernwood, in the town of Watervliet, in Albany county — on April 3d, 1883. On the 11th of June following, his widow, Mary E. Hart, "in furtherance of the views" of Mr. Hart, "and as a fitting memorial of his interest in the prosperity and success" of the Institute, gave to that corporation "the sum of sixty thousand dollars in invested funds and cash," to be "used and employed exclusively for endowing in the Rensselaer Polytechnic Institute, a professorship to be forever known and designated as the William Howard Hart Professorship of Rational and Technical Mechanics." At a meeting of the trustees of the Institute, held June 13th, 1883, this benefaction was accepted in terms of acknowledgment befitting its nature and character, and formal action was at once taken conformable to the conditions upon which the foundation was created. Among the expressions of regard and respect which were adopted at this meeting was the following resolution: "And it is further resolved, that this munificent gift by Mrs. Hart is received by the trustees of the

Rensselaer Polytechnic Institute with profound thankfulness for her great generosity toward the Institute, and revives many pleasant memories of her late husband's pure and benevolent life and character, of his love of scientific pursuits, and of his interest in the prosperity and success of the Institute, of which his father, the Hon. Richard P. Hart, was one of the first trustees, and continued in that office for eighteen years, from 1825 to his life's end in 1843 ; and that this gift is all the more valuable at this time, as evidence of the increasing confidence reposed in the character and stability of the Institute by our own people, who are willing to give it of their wealth, and also for the splendid example now set before them of the first endowment of a professorship in the Institute, and that by a lady." To this deserved tribute to the giver and to the memory of him in whose honor the gift was made, may be added the statement, that the effect of this generous act has been, without doubt, to keep alive the seeds of beneficence in some hearts, and to plant them in others, and that from these germs, at no distant future, results will follow, rich and abundant in their power to sustain and further develop into actual being, the possibilities of scientific culture which are existent in this city.

The latest benefaction made to the Institute is that of Betsey Amelia Hart. She was the daughter of William Howard, of New York, and in that city she was born December 9th, 1798. On February 8th, 1816, she became the wife of Richard P. Hart, and in that year removed to Troy, where she resided until her death, which occurred August 23d, 1886, she having lived since 1827 in the house which her father gave her in the last named year. She was the mother of fourteen children, and her other descendants numbered fifty-two grandchildren and thirty great-grandchildren. Her husband died December 27th, 1843, and during the long widowhood that followed, she constantly manifested an equanimity and good judgment that gave her the esteem of all, while her tender regard for every member of her large family and its various branches, was continually apparent and warmly reciprocated. She was interested in the success of religious, benevolent and charitable institutions, and on fitting occasions gave evidence of that interest by the bestowal of generous assistance. By her will she gave and bequeathed to the Rensselaer Polytechnic Institute the sum of

five thousand dollars, to be paid within six months after her decease, on the express condition, as stated in her will, "that the said sum, if accepted, shall be accepted by the Rensselaer Polytechnic Institute as a principal fund to be invested and kept permanently invested by it, and that the income to be, from time to time, derived therefrom, only, shall be applied to the support of said Rensselaer Polytechnic Institute."

Since pages forty and forty-one of this volume were printed, James Forsyth, the seventh President of the Institute, and who had filled that position for eighteen years, has been summoned hence. His death occurred in the city of New York, on August 10th, 1886. To what is already recorded of him in this volume may be added the statements, that he held the presidency for a longer term than any of his predecessors, the Rev. Dr. Beman alone excepted, whose term was twenty years; that during his long official career the Institute has enjoyed a greater degree of prosperity than ever before in a similar period of time; and that he was enabled, by his genial and courteous manner, his inherent common sense, and his good judgment, to maintain his position with dignity and composure, and to discharge with fidelity the duties which pertained to his important trust.

In several colleges in this country, the custom has been prevvalent for many years, for each class to procure what is known as a class-book, in which autobiographical sketches of the lives of the members of the class are recorded, and a statement of the period of time which each person remained at college. This record is intended to include all persons who have been, at any time, connected with the class. When a class graduates, the class-book is left with a class secretary, who is to be kept informed of the main facts in the subsequent lives of his classmates, and who is to enter these facts in the class-book as he receives them. When the class becomes extinct the book is deposited in the archives of the college to which the class belonged. A custom like this, if now inaugurated and maintained at the Institute, would furnish the materials for the compilation of the annals of its present and future students, and would insure the accuracy of such annals.

In the preparation of these pages much care has been bestowed in endeavoring to ascertain the titles of the printed books and pamphlets which have emanated from members of the Institute.

No separate list of such publications has been attempted, but the names of the publications of each person are given in connection with his biographical sketch. That the titles of many works have been omitted, there can be no doubt. It is to be hoped, however, that this effort to obtain the names of the publications indicated may induce others to engage in the undertaking of forming, at the Institute, a collection of such publications. A valuable addition would thus be made to the literature of the Institute, and a permanent and abiding demonstration would be presented of the character of the contributions to human knowledge which have been made by the alumni of this school of science—contributions, it is believed, so numerous, that were they all collected they would form a library of no inconsiderable extent.

While engaged in gathering the materials from which these pages have been compiled, the writer of this volume has also made memoranda of many facts and incidents which could not be incorporated in it without departing from the plan upon which it was originally designed. From these facts and incidents, and from sources which are open for his examination, might well be constructed one volume containing a history of the Institute, and another devoted to the life of its principal promoter in science, the distinguished Amos Eaton. Many will join me in expressing the hope that Dr. Nason may be induced to begin and complete these works, which would necessarily embrace within their scope a detailed statement of the plan upon which the Institute was founded, would convey a correct idea of the many-sided man who gave it form and development, and would preserve a record of the work it has accomplished in the domain of science. For the present, these pages pertaining, in great measure, to the past, while they preserve in abiding form the data they record, cannot fail also to deepen in those to whose care the future is confided, a conviction of the importance of their trust, and to incite them to renewed effort in insuring the permanence and prosperity of the Rensselaer Polytechnic Institute.

B. H. HALL.

Troy, N. Y., December 25th, 1886.

TRUSTEES

OF THE

RENSSELAER POLYTECHNIC INSTITUTE.

1824-1886.

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*Hon. JAMES FORSYTH, LL. D., Troy.....1868—86

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*Alexander Van Rensselaer, M. D.....1849—68
*John Wilkinson.....1849—55
Hon. Joseph M. Warren, A. M.....1849

LE GRAND B. CANNON.....1849—64
*D. THOMAS VAIL, A. M.....1849—82
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*ORSAMUS EATON.....1849—59
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*THOMAS W. BLATCHFORD, M. D.....1854—66
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WILLIAM H. YOUNG.....1861
*Hon. LYMAN WILDER.....1861—85
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Rev. MARVIN R. VINCENT, D. D. ..... 1868—70
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Capt. CLARENCE E. DUTTON, U. S. A. ..... 1870—76
Hon. URI GILBERT, (*ex officio*) ..... 1870—71
HENRY C. LOCKWOOD 1871
WILLIAM H. DOUGHTY, C. E. 1871
Hon. THOMAS B. CARROLL, (*ex officio*) ..... 1871—73
Hon. WILLIAM KEMP, " ..... 1873—74
Hon. EDWARD MURPHY, Jr., " ..... 1874—82
Rev. WILLIAM IRVIN, D. D. 1876
JOHN D. VAN BUREN, Jr., C. E. ..... 1876—82
CHARLES MACDONALD, C. E. 1880
JAMES P. WALLACE, C. E. 1880
JOSEPH C. PLATT, Jr., C. E. 1882
ELIAS P. MANN, C. E. 1882
Hon. EDMUND FITZGERALD, (*ex officio*) ..... 1882—86
STEPHEN W. BARKER, M. E. 1886
CHARLES W. TILLINGHAST 1886
ROBERT W. HUNT 1886
HENRY G. LUDLOW 1886
HENRY B. DAUCHY 1886

N. B. The last five Trustees were elected after the Records were printed.

RENSSELAER POLYTECHNIC INSTITUTE.

This Institution was founded on the fifth day of November, 1824, by the Hon. Stephen Van Rensselaer, of Albany, as a school of Theoretical and Practical Science.

On this date he wrote a letter to the Rev. Samuel Blatchford, D. D., of Lansingburgh, requesting him to open the school on the first Monday of January, 1825, and take charge of it as President. In the same letter he appointed Amos Eaton, of Troy, Senior Professor, and Lewis E. Beck, of Albany, Junior Professor. He appointed a Board of Trustees also, with ten articles, or orders, for the temporary government of the school.

On the 29th of December, 1824, the Board of Trustees was called together by the President. At this meeting the name, "Rensselaer School," was given to the Institution, and at this and two following meetings, June 5th and March 11th, 1825, a code of by-laws was adopted, and Mr. Van Rensselaer's letter adopted as the constitution.

In accordance with the above request, Dr. Blatchford and Professors Eaton and Beck entered immediately upon the work, opening the school on the first Wednesday of January, 1825.

The school was incorporated March 21st, 1826, by special act of the Legislature, under the name of "The Rensselaer School," and for purposes set forth in the preamble of the act, as follows: Laws of 1826, p. 63.

The act proceeds to name Simeon DeWitt, Samuel Blatchford, John D. Dickinson, Guert Van Schoonhoven, Elias Parmelee, Richard P. Hart, John Cramer and Theodore Romeyn Beck as trustees, and to define their powers. The income was limited to $20,000 a year.

On the eighth of February, 1828, Governor Clinton transmitted to the Legislature, with his cordial approval, an application from the trustees of this school, consenting to an alteration

of their charter, so as to vest in the Regents, or in the Trustees, the power to change its location to any place in Albany, Rensselaer, Saratoga or Schenectady counties, and by a change that might allow the appointment of trustees—two from each of these counties—without regard to any particular city or village therein.

The gratuitous use of the school, with all its apparatus and facilities of every kind, was tendered to the Legislature for the purpose of qualifying suitable persons for teaching the practical application of the experimental sciences to agriculture, the arts, manufactures and domestic economy. There had been expended within seven years over $10,000 in making trials to ascertain the best and most economical method of teaching the practical application of experimental science, and extending it to the laboring part of the community, and in searching out the natural resources of the State. The collections and library were valued at $3,615, and the real estate at $1,348, making, with recent additions, $3,009. The free use of a large brick building formerly used by the Farmers' Bank was also offered, with several wooden buildings then occupied by the school.

This application was referred to the Regents, and on the eleventh of March, 1828, they agreed upon a lengthy and highly favorable report, as follows:

"The sciences taught in the Rensselaer School are immediately connected with agriculture and the arts, and are considered indispensable to the successful prosecution of the great branches of manufacturing labor, in wool, cotton and iron, in which the nation has embarked, and upon the success of which the prosperity of our State is materially involved. The plan of instruction is new, and in the opinion of the committee, perfectly efficient and highly commendable. By putting the pupil in the place of the professor, he necessarily acquires a knowledge of the principles of the science on which he lectures; while the experimental demonstrations of the laboratory render him familiar with the practical application of those principles to agricultural and manufacturing operations."

The committee proceed to consider at length the advantages to be derived from such an institution, refer to the particular industries that derive aid from chemistry and other sciences, and conclude by saying that they do not hesitate to express their

belief "that the system of instruction pursued in the Rensselaer School is eminently calculated to promote the best interests of the State, and they therefore respectfully suggest that the Board of Regents do recommend the proposition of the Trustees to the favorable consideration of the Legislature."

The building used for the purposes of the school was the old Farmers' Bank building, still standing on the northwest corner of Middleburgh and River streets.

In 1832, by an act of the Legislature, the name was changed to "The Rensselaer Institute." Laws of 1832, p. 567.

In April, 1834, the Rensselaer Institute, with the consent of Hon. Stephen Van Rensselaer, was removed to the Vanderheyden Mansion House in Troy, on the south side of Grand Division street, east of Seventh.

By an act passed May 9th, 1833, the Trustees of the Rensselaer Institute (formerly Rensselaer School,) were empowered to establish a Department of Mathematical Arts, for the purpose of giving instruction in engineering and technology as a branch of said Institute, and to receive and apply donations for procuring instruments and other facilities suitable for giving such instruction in a practical manner, and to authorize the President to confer certificates on students in said department, in testimony of their respective qualifications for practical operators in the mechanical arts.

In 1835, an act was passed, increasing the number of Trustees, adding the Mayor and Recorder, and also the Alderman of the Fourth ward. Laws of 1835, p. 296.

The act incorporating the Troy Academy was revived May 8th, 1837, and the Trustees were allowed to unite with those of the Rensselaer Institute, and to be known as the Department of Classical Literature of the latter. Each was to conduct its own operations according to its own laws and usages, and as respected the use of instruments, apparatus and library, particularly in field exercises and various excursions for purposes of improvement in the mathematical arts and the natural sciences.

Soon after the death of Prof. Amos Eaton, Senior Professor, which occurred May 6th, 1842, Prof. George H. Cook, C. E., B. N. S., of the class of 1839, was appointed to fill his place. By him the school was reorganized, and the courses of study somewhat extended.

In 1843, the city of Troy gave to the Rensselaer Institute "the Infant School lot," northwest corner of Sixth and State streets, and the building thereon, valued at $6,500, provided William P. Van Rensselaer, a son of the "patroon," gave a like amount in money, to which proposition he acceded.

In 1844, the Rensselaer Institute was removed from the "Vanderheyden Mansion House" to the building erected on "the Infant School lot."

The Institute, under this union, was received and made subject to the visitation of the Regents, with the privileges of an academy, February 5th, 1846, and was classed with them until its reorganization in 1852, receiving for eight years a share of the literature moneys distributed to the academies of the State. It has at several times received appropriations from the Legislature. In 1863, it obtained a grant of $10,000 to assist in rebuilding after the fire; in 1868 it received $15,000, and in 1871 $730.

In 1847, B. Franklin Greene, C. E., B. N. S., of the class of 1842, was appointed in place of Professor Cook, who had resigned to accept a position in another institution. By Professor Greene, new plans for the extension of the course were made, the number of instructors increased, and in 1849, it may be said that a complete change and re-organization were effected, "with a view to enable it to discharge with all possible efficiency its intended functions as a Polytechnic Institution, including those in a more special sense of a College of Engineering." Among the changes then introduced were, a material enlargement of its course of study, with a proportionate increase of time allotted to it, and a correspondingly more elevated, and more rigidly held, standard of requirements for the admission of candidates to scholastic honors.

By an Act passed March 8, 1850, the restriction as to places of residence of Trustees was removed, and the number was increased to 19, the first members of the new Board being named. The office of Director was created. He was always to be an acting member of the Faculty. (Laws of 1850, p. 54.)

By an act passed April 8, 1861, a full Board of Trustees was named, their powers enlarged and defined, and the name changed to the "*Rensselaer Polytechnic Institute.*" (Laws of 1861, p. 428.)

The purposes of the Institute were declared to be, the main-

tenance in the city of Troy, of a school for instruction in Mathematics, Civil Engineering, Chemistry, Mineralogy, Geology, Botany, Literature, and, in their application to the arts, Agriculture, Domestic Economy and Manufacturing, as the Trustees might direct.

The Faculty, consisting of the President of the Board of Trustees, the Director, Professors and Instructors, were to have charge of instruction and discipline, their duty being to pursue such a system as would be calculated to make thorough scholars in the several branches of civil engineering, and other studies in the Institute.

The Trustees might confer the degrees of Civil Engineer, Topographical Engineer, Bachelor of Science, and such other academic honors as they might see fit, upon those who had pursued the course of study prescribed, and who had passed a thorough examination, and had been recommended by the Faculty. The Institute was subject to visitation by the Regents, and entitled to the same privileges as academies, colleges and schools of the higher order, upon complying with the terms required by law, and with the votes of the Regents. The change of name was to affect no right.

The fire of May 10, 1862, destroyed the buildings and all the furniture, appurtenances, library and cabinets, together with the records of the Board of Trustees. The School took refuge in the University on the hill (now the Provincial Seminary), until the fall of the year, when it obtained quarters in Vail's Building, northeast corner of Congress and River streets, till May 1st, 1864, when the Rensselaer Polytechnic Institute entered into possession of the land and buildings at the head of Broadway, where it now stands, a substantial and imposing structure, 115 feet long, 50 feet wide, and four stories high. It contains full suites of recitation, lecture, and drawing rooms, the cabinet of natural history, the library, and the quarters for the janitor. The rooms are spacious, conveniently arranged, and well lighted and ventilated. The corner-stone was laid March 28th, 1863, with appropriate ceremonies.

The Winslow Laboratory, named in honor of John F. Winslow, Esq., of Poughkeepsie, former President of the Institute, was commenced in 1865, and completed September, 1866. On August 27th, 1884, this building was partially destroyed by fire.

The upper story, containing lecture room, recitation room and library, was burned. The apparatus and collections used for general chemistry and over one thousand volumes of chemical works were wholly lost. The building was immediately remodelled, somewhat enlarged and made ready for occupancy February 1st, 1885. It is 70 feet in length, 40 in width and three stories high. The first story contains the metallurgical laboratory. The second story contains the chemical laboratory, and the third floor the lecture, recitation and apparatus rooms, which are fitted up in the most approved manner for complete courses in general and analytical chemistry.

The Williams Proudfit Observatory, erected by the late Ebenezer Proudfit, Esq., of Troy, as a memorial of his deceased son, formerly a member of the Institute, occupies a commanding site, and consists of a central part 30 feet square, with north, south and east wings, with a total length of 76 and total breadth of 60 feet. The central part is two stories in height, surmounted by a dome 29 feet in diameter, under which is the large pier designed for an equatorial telescope. The east wing contains piers for the meridian instruments, and the other wings are used for computing and clock rooms, and library.

The site selected for the Institute Buildings, on the eastern slope of the city, at the head of Broadway, combines the advantages of a commanding position, and quiet surroundings, with great convenience of access.

The "Henry B. Nason Collection of Minerals," named for the donor, contains nearly 5000 specimens, arranged in several divisions to illustrate their structural, physical and chemical properties; also, a large number of models.

The Geological Collection is divided into several sections, illustrating lithological and phenomenal geology, the geology of some peculiar localities, and paleontology. The State Paleontologist was directed by act of April, 23, 1864, to present to the Institute as full a series of fossils from the duplicates of the State Museum as could be made up, for the use of the school, and these were added to the collection.

A valuable collection of rocks illustrating the lithology of the State of New York has been recently given to this department by Joseph Mullen, Jr., C. E., of Watertown, N. Y., as a memorial

of his brother, Anthony T. E. Mullen, C. E., late Passed Assistant Engineer in the U. S. Navy.

The Collection of Shells contains nearly 10,000 specimens, and was made and arranged by the late Henry Rousseau, Esq., of Lansingburgh. Many of the specimens are very rare, and the completeness of several genera is quite remarkable. A number of very handsome specimens of coral, and about 500 specimens of shells, were added to this collection by Mrs. George B. Warren.

The Herbaria contain about 5,000 specimens of American and European plants, and nearly 300 specimens of wood from all parts of the world.

The Collection of Birds, numbering 140 specimens, with the Indian relics and curiosities, was presented by the Troy Lyceum of Natural History. Another collection of very rare birds from all parts of the world, numbering 220 specimens, and made by the late George B. Warren, Esq., was presented by Mrs. Warren as a memorial of her husband. During the year 1884 the collection was considerably increased by John Hobart Warren, Esq.

The Metallurgical Collection contains a very large number of metals and products from their ores. It is especially rich in the different varieties of iron, steel, and slags, from works in the vicinity. Copper, lead, zinc, silver, and gold, are also well represented.

The Chemical Cabinet contains a complete set of chemical elements and many of their compounds; also specimens illustrating the manufacture of glass, earthenware, porcelain, gunpowder, illuminating gas, coal tar products, and a large collection of specimens of common salt, native, and manufactured from American and European brines. A large number of models, charts, maps, engravings, and photographs, add much to the completeness of these collections.

In addition to the foregoing, a collection of minerals and rocks numbering over 3,000 specimens is placed in the mineralogical lecture room, for the constant use of the students in the lectures and practical exercises.

The Library contains many valuable scientific works. It has recently been increased by a valuable collection of American and foreign scientific periodicals, and, in 1882, was enriched by the bequest of the very valuable professional library of the late

Alexander L. Holley, LL. D., of Brooklyn, N. Y., formerly a trustee of the Institute.

The collections of Apparatus and Instruments in the Departments of Astronomy, Geodesy, Chemistry, and Physics, are quite complete and in good order.

Additions are being made every year to these collections, which already are of great value and assistance to the student.

During the year 1882, through the liberality of several citizens of Troy, provisions was made for the addition of many valuable and specially useful pieces of apparatus, to the collections in the departments of Mechanics, Physics, Astronomy, Geodesy, and Drawing. Most of these have already been procured, and others will be secured as rapidly as they can be properly selected.

There are extensive collections of various kinds, in different departments of the natural and physical sciences, including apparatus, instruments and models, and other conveniences for instruction.

The total value of property is reported at $200,000, of which $110,500 is in buildings and grounds; $10,500 in library; $37,500 in educational collections, and $108,500 in property of other kinds.

The number of graduates June, 1885, was 32; whole number of graduates, 852.

The Register for 1885 shows a list of 19 professors and instructors, and an attendance of 234. There is now but a single course of instruction, which all regular members of the Institute pursue. The degree conferred is that of Civil Engineer. This includes mechanical or dynamical engineering, road engineering, bridge engineering, hydraulic engineering, steam engineering and mining engineering. The studies of the course, which extends throughout four years, are designed to secure to all graduates a professional preparation at once practical and thorough for the following specialties of engineering practice:

The location, construction and superintendence of public works, as railways, canals, water works, etc.; the design, construction and management of mills, iron works, steel works, chemical works and pneumatic works; the design and construction of roofs, arch bridges, girder bridges and suspension bridges; the survey and superintendence of mines; the design, construction and use of wind motors, hydraulic motors, air

engines, and the various kinds of steam engines; the design, construction and use of machines in general, and the determination of their efficiency; the survey of rivers, lakes and harbors, and the direction of their improvements; the determination of latitude, longitude, time, and the meridian in geographical exploration, or for other purposes, together with the projection of maps; the selection and tests of materials used in construction; the construction of the various kinds of geometrical and topographical drawings.

In addition to the regular course there are now summer courses during vacation, in chemistry and assaying, continuing six weeks, when classes can be formed of not less than eight members.

In 1874, June 14th to the 18th, a semi-centennial celebration of the Institute was held. A large number of the graduates and friends of the school gathered from all parts of the country. A monument to Prof. Amos Eaton was placed in Oakwood Cemetery, and a handsome memorial window, bearing his portrait, was placed in the large hall of the Institute.

STEPHEN VAN RENSSELAER,

PATRON.

HON. STEPHEN VAN RENSSELAER, LL. D., known as the "patroon," was born in New York, Nov. 1st, 1764, and died in Albany Jan. 26th, 1829. He was the fifth in lineal descent from Kiliaen Van Rensselaer, the original patroon, or proprietor, of the "whole of Rensselaerwyck," who in 1630, and subsequently, purchased land which in 1637 formed a tract of 24 miles in breadth and 48 in length, extending from the immediate vicinity of Fort Orange (now Albany) over the greater part of Albany, Rensselaer and Columbia counties. The mother of Stephen was Catharine, daughter of Philip Livingston, the proprietor of Livingston Manor, under whose care he was placed by his mother, after the death of his father.

He entered Princeton College in 1778, but owing to the proximity of the British army, was removed to Harvard College, where he was graduated in 1782. He married, the next year, a daughter of Gen. Philip Schuyler. In 1789, he was elected to the House of Assembly of this State and the next year to the Senate, to which he was re-elected annually until 1795, when he was chosen Lieutenant-Governor, which office he filled for six years. He was member of the constitutional convention in 1801, and most of the time its presiding officer, and in 1810 to 1811 was one of the commissioners for exploring the route and considering the feasibility of a western canal.

He was made a commander of cavalry of the State with the rank of general in 1801, and in 1812, soon after the commencement of the war, was called by Gov. Tompkins to the command of the New York militia. He served two months, assaulting and taking Queenstown, Canada, but was eventually defeated in consequence of the refusal of the militia under his command to go out of the State, from alleged constitutional scruples. Disgusted with their conduct, he resigned. In 1813, as once before, he was a candidate for governor, being both times defeated by an inconsiderable majority.

After the war he devoted his energies, in connection with De

Witt Clinton, to the prosecution of the Erie Canal, and was from 1815 until his death one of the board of canal commissioners, and for 15 years its president. He was again a member of the Legislature in 1816; in 1819 was elected regent of the State University, and subsequently its chancellor; in 1820 president of the agricultural board of the State, and in 1821, a member of the constitutional convention. In 1821-22 Prof. Amos Eaton, under his direction and at his expense, made a geological survey of Albany and Rensselaer counties, including an analysis of their soils, and in 1823 a similar survey across the State, along the line of the Erie canal, while Prof. Edward Hitchcock, afterward president of Amherst College, was employed to make another across New England. These surveys he published in 1824, at his own cost. He next employed Prof. Eaton to deliver familiar lectures on natural science throughout the State.

In November, 1824, he provided suitable buildings at Troy, and established a scientific school for the instruction of teachers with two professors, employed at liberal salaries. This school was incorporated in 1826 as the Rensselaer Institute. Fully one-half of the current expenses were borne by Gen. Van Rensselaer, and he made the offer to the clerk of each county in the State to nominate one pupil to enjoy a three years' course of gratuitious instruction at the Institute, the only condition being that they should teach for one year after graduation. He continued to aid in supporting the institute until his death.

In 1823 he was elected to Congress and subsequently re-elected for eight consecutive terms. His vote determined that of the delegation from New York in favor of Mr. Adams, and caused his election. In 1825 Yale College conferred on him the degree of LL. D. (See "A Discourse of the life, services, and character of Stephen Van Rensselaer, with a Historical sketch of the colony and Manor of Rensselaerwyck," by Daniel D. Barnard, Albany, 1839.)

Says Rev. Dr. Sprague: "He could claim, on the score of earthly rank, perhaps, as much as any individual in the land. He was not only rich, but, unlike most others in this country, he had never known what it was to be poor. He was high in office, both civil and military." He was equally distinguished for his piety and active benevolence.

PRESIDENTS.

The Rev. Samuel Blatchford, D. D., the first president of the Institute, was born in Devonshire County, England, in 1767. He was educated for the ministry at the Dissenting College of Theology, at Homerton, near London; married in 1788; ordained in 1789 pastor over the Presbyterian Church in Kingston, Devonshire. In 1791 he became pastor of the church at Topoham, near Exeter, in Devonshire, where he remained until in answer to a call from the church at Redford, Westchester County, N. Y., he, in 1795, came to America. For eleven years he lived at Redford and at Bridgeport, Conn., and in 1804 he was called to take charge of the church at Lansingburgh and Waterford. Here an acquaintance with the Hon. Stephen Van Rensselaer grew into a friendship, and he was named in 1824, by the founder, as one of the trustees and first president of the Institute. This position he held for four years. He died at Lansingburgh on the 27th of March, 1828. He was the father of Dr. Thomas W. Blatchford, of Troy; of Richard M. Blatchford, of New York, and the grandfather of the Hon. Samuel Blatchford, U. S. District Judge for the Southern District of New York.

The Rev. John Chester, D. D., second president of the Institute, was for twelve years pastor of the Second Presbyterian Church in the city of Albany, from 1815 to 1828. He was born at Weathersfield, Conn., in August, 1785—the son of Col. John Chester, of the Revolutionary Army. He entered Yale College in 1801 and graduated in 1804. He pursued his theological studies under the direction of Dr. Joseph Lyman, of Hatfield, Mass., and was licensed to preach by the Hartford Association College in 1807, at the age of 22. His first efforts to publish the gospel were made in Marblehead, Mass. He also preached a short time in Springfield, Mass., and also in Middletown, Conn., and then removed to this State and was stationed at Cooperstown, and from 1810 to 1815 was pastor at Hudson, from which latter place he was called to Albany, where his relations

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with Mr. Van Rensselaer, the Founder, was such as led to his appointment and acceptance of the office of President on the 25th of June, 1828, which office he held, in the declining state of his health, for the period of only about six months. In 1821 he was honored with the degree of Doctor of Divinity by the corporation of Union College. He died at Philadelphia on the 12th day of January, 1829. He was an eminent divine of that day, of great learning and eloquence, and having the respect and love not only of the people of Albany but of all the Church. An eloquent scholar himself, and deeply convinced of the connection and dependence between science and religion, he was devoted to the cause of education. He married, in Philadelphia, the daughter of Robert Ralston. He was the associate and friend of Chancellor James Kent, and succeeded him as the president of the Albany Female Academy, of which he was one of the founders. He was also a patron and trustee of the Albany Academy. Dr. Nott preached his funeral sermon. He left a family. One of his daughters married J. L. Van Schoonhoven, Esq., of Troy.

ELIPHALET NOTT, D. D., LL. D., the third president of the Institute, and at the same time President of Union College, Schenectady, N. Y., was born in Ashford, Windham County, Conn., June 25th, 1773, and died in Schenectady, January 29th, 1866. He was to a great extent self-educated, having never received a college training. He studied divinity in his native county, and at the age of twenty-one was sent out as a domestic missionary to the central part of the state of New York, at that early day offering a wide field for evangelical effort. On passing through the old settlement of Cherry Valley, he was requested to take charge of the Presbyterian Church at that place, which call he accepted, and, in addition to his pastoral duties, he also became a teacher in the Academy. Two or three years later he was called to the Presbyterian Church at Albany, where he at once took a prominent position as a preacher, and was listened to by large congregations. Among his successful pulpit efforts while at Albany, was a sermon on the death of Alexander Hamilton. In 1804, he was chosen President of Union College, Schenectady, which place he continued to fill for sixty-two years, until his death, being the oldest head of any literary institution in the

United States and doubtless in the world. Probably fully 4,000 students graduated during his Presidency, and among them some of the most eminent men of the country. In the language of a well known publicist, "Union College is emphatically of his own formation; he came to it in its poverty and infancy, and has raised it to wealth and reputation." In 1854 occurred the semi-centennial anniversary of his Presidency, when there came together to do him honor between 600 and 700 of the men who had graduated under him. Dr. Nott was an earnest advocate of temperance, and published at Albany, in 1847, "Lectures on Temperance." Although he has written largely, and on many subjects, his publications are confined principally to occasional addresses and "Counsels to Young Men," (New York), and a discourse delivered before the General Assembly of the Presbyterian Church. He devoted much thought and attention to the laws of heat, and, besides obtaining some thirty or more patents for applications of heat to steam engines, the economical use of fuel, &c.; he was the inventor of a stove bearing his name and very extensively used. Dr. Nott stood pre-eminent as an educator, and was universally esteemed, venerated, and loved by the many who enjoyed his teachings and counsels. His labors in the temperance cause, both by voice and pen, and his many and long-continued experiments on heat, with the view of applying it to useful and economical purposes for human benefit, if not as successful as he had hoped, evinced the fertility of an intellect which loved to rise itself for the good of others. As a preacher, his style of thought, his manner, his elocution were all his own —the chief characteristic being his impressiveness. In 1805, the College of New Jersey conferred upon him the title of D. D., and in 1828 he received the title of LL. D. He married the daughter of Rev. Joel Benedict, D. D., of Plainfield, Conn., under whose instruction in early life he pursued his classical and mathematical studies.

NATHAN SIDNEY SMITH BEMAN, D. D., the fourth president of the Institue, was born in that part of Canaan, N. Y., which is now called New Lebanon, on Sunday, November 26th, 1785. He was a son of Samuel and Silence (Douglass) Beman, his paternal ancestors being of German and his maternal ancestors of Scotch origin. When he was four or five years of age his parents re-

moved to Hampton, Washington County, N. Y., then called Greenfield. His father was a gentleman of the old school, who was strongly attached to ancient customs in dress, and to the day of his death, which occurred in 1845, he wore the short breeches and knee buckles and queue of old times. He was a man of good intellect and business capacity. He was a communicant of the Protestant Episcopal Church, and his funeral was attended by the Right Rev. Dr. Onderdonk, then bishop of New York. Nathan commenced his preparation for college, in company with the late Hon. Rollin C. Mallory, at Poultney, Vt., in 1801, with Mr. Bolles, an eminent teacher, a graduate of the University of Dublin. In 1802 he went under the tuition of a private instructor at Williamstown, Mass, then at the grammar school in that place. He entered Williams College in 1803, but at the close of his freshman year took a dismission, and spent the following year in teaching at Fairhaven, Vt. In the summer of 1804 he entered Middlebury College, graduating in 1807. His classmates were Ira Bascom, D. A. A. Buck, Miles Purdy, Stephen Royce, William Slade and Oliver Stewart. Four of this class, including Dr. Beman, became distinguished men, and perhaps in no one class of the college have so many attained eminence as the class of 1807. Mr. Buck was long a member of Congress; Mr. Royce was Chief Justice of the Supreme Court and Governor of Vermont, and Mr. Slade was a member of Congress and also Governor.

After graduating he became preceptor, in the autumn of 1807, of Lincoln Academy at Newcastle, Maine, where he remained more than two years, at the same time pursuing the study of theology with Rev. Kiah Bailey. He was licensed to preach June 14, 1809, by the Lincoln and Kennebec Association. About the same time he was appointed tutor at Middlebury and entered upon the duties of his appointment; but receiving an earnest call from the Third Presbyterian Church in Portland, Me., to which he had preached a few times, he resigned the tutorship and was ordained pastor of that church March 14, 1810. Rev. Kiah Bailey preached the sermon. His health failed in a year or two, with decided symptoms of consumption, and in October, 1812, he was dismissed. He immediately went south and took up his residence in Hancock County, Georgia, at a place afterward called Mount Zion, where he organized a

Presbyterian Church and established an academy. Under his superintendence, which continued about ten years, the academy acquired a high reputation and attracted a large number of students.

In 1818 he was elected President of Franklin College, at Athens, Ga. He accepted the office, but held it for only one year, and then returned to his academy at Mount Zion. Coming north in the summer of 1822, he preached on the first Sunday in September in the First Presbyterian Church in Troy, N. Y., and by invitation of the officers continued to supply the pulpit until the following November, when he was called to the pastorate. He accepted the call, and was installed June 14, 1823. Rev. Nathaniel S. Prime preached the sermon. In this pastorate he continued just forty years, during which time he received into the church 1,840 members, of which twenty-six became clergymen. He was dismissed June 17, 1863, at his own request, and the church voted him a life annuity of $1,000. He died at Carbondale, Ill., August 6, 1871, at the advanced age of eighty-six years.

In 1824, he was elected a trustee of Middlebury College, and continued so until his death—having been a member eighteen months longer than any of his associates. In 1846 he was elected President of the college, but declined the office. He received the degree of doctor of divinity, from Williams College in 1824, and of doctor of laws from Middlebury College in 1852. His earliest publication was a sermon, occasioned by the death of Rev. Oliver Hulburt, preached at Waynesboro, Georgia, November, 1814, and prefixed to a posthumous collection of Mr. Hulburt's sermons. In 1825, he published "Four Sermons on the Doctrine of the Atonement," in a duodecimo volume. He also compiled the "Church Psalmist," a collection of hymns for public worship. A large number of his sermons have been published separately.

Dr. Beman was one of the Vice Presidents of the Rensselaer Polytechnic Institute from 1842 to 1845, and was the President from the latter year to 1865. During these twenty-three years he was also a member of the board of trustees. Brought thus in connection with many young man, at a formative period of their lives, he never neglected any proper opportunity to impress upon them the duty that they owed to themselves, to their

parents or guardians, and to society at large, to increase in wisdom and knowledge, and to show by a studious and honorable deportment, a full appreciation of the privileges to which they were admitted.

The early life of Dr. Beman gave promise of a brilliant future, which his manhood more than fulfilled. For nearly sixty years he stood at his post, full of vigor of mind and strength of body, and then retired to die in a western home attended by the careful ministrations of a beloved daughter. He was a master mind, having a reputation as wide as the limits of his country as a leader among men. A quarter of a century ago a discerning writer said of him, "If ambition for political distinction had been his ruling passion, he could not have failed by his own commanding intellect to have risen to the highest honors, and that, too, without the aid of these petty means and miserable shifts that some little minds resort to 'to be the things they are not.'" His remarkable prophesies as foreshadowed in several of his Thanksgiving sermons, indicated full well the power he would have exerted as a statesman in public life. Some of his discourses were characterized as intensely political, but he always claimed the right of the pulpit to attack evil whether in church or state, but it was only in Thanksgiving sermons that he ventured upon political subjects.

As a pulpit orator he had few superiors—calm, dignified, earnest—oftentimes intensely earnest, but never nervously impassioned—always keeping control of himself and his audience. He was not always confined to manuscript; some of his extempore discourses were his best. His celebrated sermon on the French revolution, delivered before many audiences, was never committed to writing in form, but bore evidence of great thought and was logically divided into divisions. It occupied two hours in its delivery, and never wearied, but enchained the fixed attention of his audience throughout. He was in truth one of the theological and intellectual giants of his time.

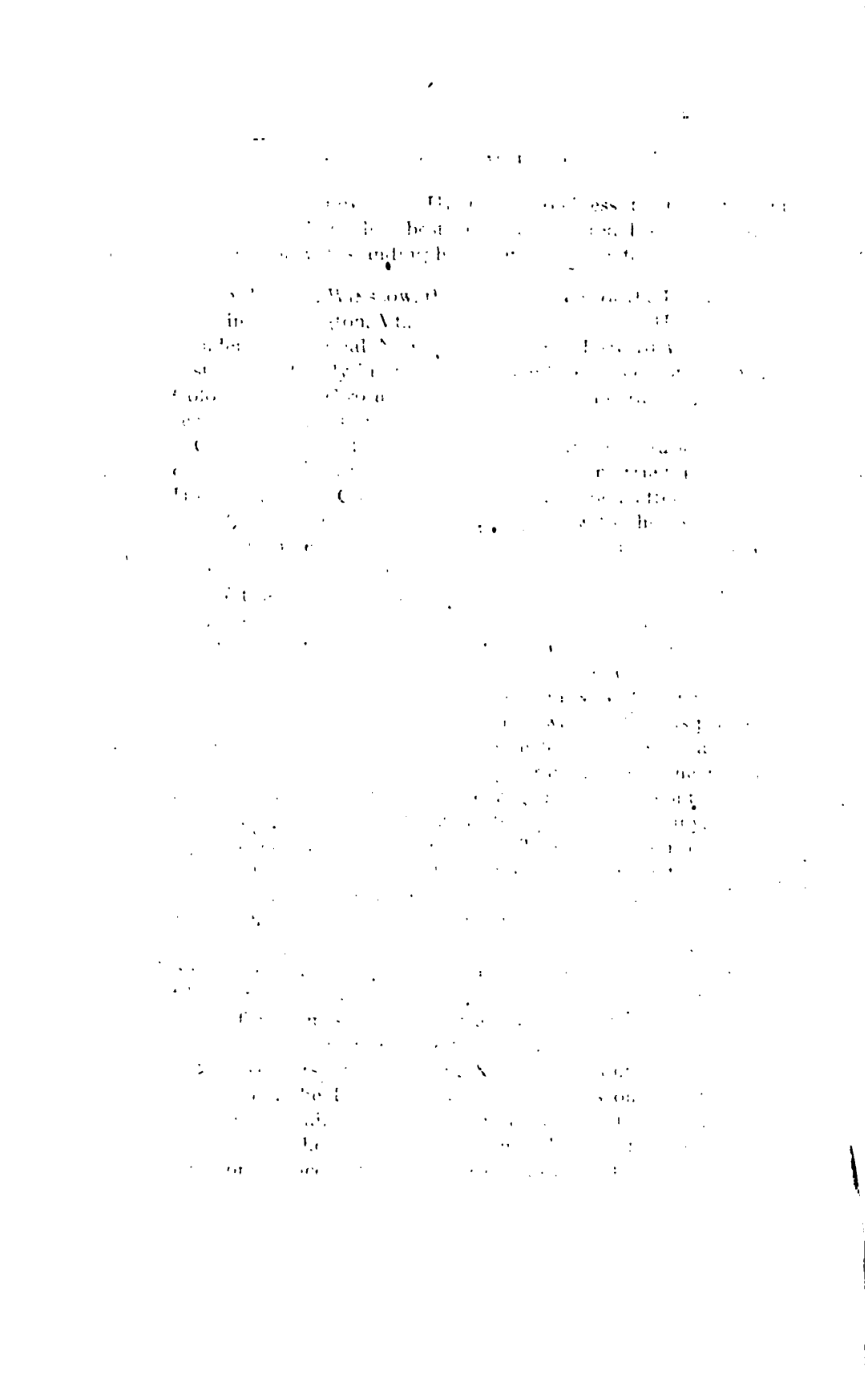
He was to those familiar with him a man of rare social qualities, although at times peculiar. He was misunderstood by some, who thought him haughty, cold, over-bearing, tyrannical; yet he was kind, loving, but the most sensitive of men, touched to the very life by a "slight, and pleased beyond

measure by a kindness." His native goodness stood transparent to those who knew him best, and all admired his commanding abilities, nothwithstanding his ofttimes cold exterior.

Hon. JOHN F. WINSLOW, the fifth president of the Institute, was born in Bennington, Vt., November 10th, 1810. He is the descendent of original New England stock, Edward Winslow, the first of the family in this country, and Governor of Plymouth Colony, and his brother Gilbert, being among the original passengers by the historic Mayflower.

Captain Richard Winslow, of the sixth generation in this country, was born in Lyme, Conn. He married in 1804, at Hartford, Mary Corning Seymour, and soon after moved to Albany, where he resided all of his life, with the exception of six or seven years passed in Bennington, Vt., previously to 1815. A large family was the result of this union, John Flack, the subject of this biography, being the fourth child. He was educated at the select schools of Albany, pursuing his studies till 1827, when, declining a professional in favor of a business career, he entered a commercial house as a clerk. After a few years he secured a place in a commission house in New York City, where he remained till his majority, when he was sent by his principals to New Orleans to establish a branch office. After a twelvemonth in the South, the climate being uncongenial, he returned to New York, and in 1831 was charged with the control of the works and business of the New Jersey Iron Company, as managing agent, resident at Boston. This connection lasted two years, during which time the young superintendent thoroughly mastered all the details of the important industry. In 1833 he turned the exhaustive knowledge thus acquired to personal account by engaging in the production of pig iron in Bergen and Sussex counties, New Jersey. He continued in this enterprise till 1837, when he formed a connection, which lasted under varied firm names for thirty years, with one of the conspicuous promoters of local enterprise, the late Erastus Corning, of Albany.

The partnership of Corning & Winslow, controlling both the Albany and the Rensselaer Iron Works, was one of the largest producers of railroad and other iron ever established in America, and probably held a higher position in the industry and exerted a more pronounced effect upon the domestic market than any other.



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Mr. Winslow, in order to give his exclusive attention to the business, took up his residence in Troy, the seat of the enterprise, where he lived till 1867. In 1863 the late John A. Griswold became a partner of Corning & Winslow in the Rensselaer Iron Works. This company, under the supervision of Mr. Winslow, who in 1852 and 1864 went to Europe purchasing very largely of railroad iron and securing control of the most improved English and continental processes, did an enormous business. Among the valuable results of Mr. Winslow's sagacious enterprise was the purchase of the right to manufacture and sell Bessemer steel in the United States, a feature of the works since developed into a large and remunerative industry.

The signal achievement of Mr. Winslow's life, which will identify an industrial career exceptionally rich in great business results with the history of the nation, occurred in 1861. During the spring and summer session Congress had appropriated $1,500,000 for the completion of one or more armored, or iron or steel clad, vessels of war, or floating steam batteries. John Ericsson, of New York City, of established reputation as an engineer, through his successful adaptation of the propeller to the propulsion of vessels, had prepared designs for iron-clad offensive and defensive war ships, but required the aid of large capital to carry out his theories. At this juncture, naturally attracted by the fame of the Rensselaer Works, he established personal relations with their principal and manager. The exposition of Ericsson's plan for armoring ships could not have been presented to a bolder, more appreciative or more exacting discrimination. Mr. Winslow at once grasped the importance of the engineer's theme, and determined to secure its practical development. With this view, in company with John A. Griswold, of Troy, and C. S. Bushnell, of New Haven, Conn., he visited Washington and submitted the plan of Ericsson to the President, Navy Department and the Naval Committees of both houses. The admirable argumentation of the inventor, and the robust and convincing earnestness of the business men at his back, were effective. Shortly afterward the Naval Board, composed of Commodores Joseph Smith, H. Paulding and Captain C. H. Davis, recommended that an experiment be made with one battery of the description presented by Captain Ericsson, with a guarantee and forfeiture in case of failure in any of the

properties and points of the vessel, as proposed. The contract, as made, stipulated for the completion of the battery within one hundred days from the signing of the contract, which took place on October 5th, 1861, and the extraordinary provision was introduced that the test of the battery, upon which its acceptance by the United States Government depended should be its withstanding the fire of the enemy's batteries at the shortest ranges, the United States agreeing to fit out the vessel with men, guns, and other equipments.

The building of the battery was begun in October, 1861, at the establishment of T. F. Howland, Greenpoint, L. I., the contractors advancing upwards of a quarter of a million of dollars for the purpose, and was prosecuted under the direct supervision of Captain Ericsson. The machinery, the plating of the vessel, and portions of the other iron work were manufactured at the Rensselaer Iron Works, and Corning Iron Works, in Troy. On the 30th of January, 1862, the battery, which had been named the "Monitor," was launched. The entire cost of the vessel complete and ready for active service was only $275,000—less than the government had paid for the engines alone of many a third-class gunboat. The "Monitor" was delivered to the government March 5th, 1862, and at 10 o'clock in the evening of Friday, March 8th, made her appearance at Fortress Monroe. The following day occurred the memorable engagement with the rebel ram, "Merrimac," which had already sank the "Cumberland" and "Congress," and disabled several other vessels of the Federal fleet in Hampton Roads, when it encountered the "Monitor." In this engagement the "Merrimac" was disabled and compelled to retire. It has been said that the fate of the war was decided by this early and brilliant success of the "Monitor," for had the career of the "Merrimac," not been thus timely arrested, Fortress Monroe might have been lost to the Union, and millions of dollars worth of shipping and public property destroyed, and thousands of lives sacrificed.

Charles B. Boynton, D. D., in his "History of the Navy During the Rebellion," published with the sanction of the Navy Department, thus speaks of the inventor and builders of the "Monitor." "The genius that conceived the 'Monitor,' and the patriot manufacturers who perilled reputation and money in her

construction, were as truly among the heroes and saviors of the country, as the President and his cabinet, or our Legislatures, or the generals at the head of our armies, or our naval officers in their victorious ships. These men were the Hon. J. A. Griswold of Troy, N. Y., C. S. Bushnell of New Haven, and John F. Winslow. The names of such men should be handed down in history equally with those who fought our battles, or those who distinguished themselves as statesmen and legislators."

Mr. Winslow retired from active business affairs in 1867, in which year he removed to Poughkeepsie, where he resided. During his residence in Troy, he was conspicuous for his interest in local politics and social improvement. He was from 1863 till the date of departure, President of the Rensselaer Polytechnic Institute, director of the Merchants and Mechanics' Bank, and connected with the management of other monetary and benevolent institutions. In his new home, his ability and public spirit have similarly demonstrated themselves. He has been director of the Fallkill Bank since 1867, director and president of the Poughkeepsie and Eastern Railroad, and is president of the company for constructing the bridge over the Hudson River. Since 1870 he has been trustee of the Presbyterian Church near his residence. Mr. Winslow has been twice married, the first time in September, 1832, to Miss Nancy B. Jackson, daughter of William Jackson, of Rockaway, N. J., who died in December, 1861, and again in September, 1867, to Miss Harriet Wickes, of Poughkeepsie, daughter of Rev. Thomas Wickes, of that city.

THOMAS C. BRINSMADE, M. D., the sixth president of the Institute, a prominent physician of Troy, who honored his profession with "good works," was born at New Hartford, Conn., June 16th, 1802. He studied medicine with Dr. Peet, of New Marlboro, Mass., and in March, 1823, was licensed a practicing physician by the Connecticut State Medical Society. In 1839 the honorary degree of M. D. was conferred on him by Yale College. In the latter part of 1823 he removed to Lansingburgh, and after ten years practice in that village removed to Troy.

Dr. Brinsmade may be said to have been a life-long student of medicine and hygiene. He industriously applied himself in

getting knowledge, both from men and books, which would be useful to him in the studies of his profession. As said by his eulogist before the Rensselaer County Medical Society, "He practiced medicine with a singleness of purpose never excelled, carefully cultivating every department of the profession, avoiding all tendency to special practice, and yet was the trusted counselor of those whose tastes led them to cultivate special branches. He would be one hour discussing surgical pathology and the propriety of an operation; the next, perhaps, equally engrossed in grave questions of gynaecology; on each occasion the associate of men devoted to these specialties. In breadth of professional capacity it is safe to say Dr. Brinsmade had few, if any, superiors in the profession." As a local physician he was a sedulous observer and investigator of diseases special to this vicinity. In the records of his private practice he left invaluable data for reference and practical application. For thirty-five years he made Troy the field of his successful practice, and endeared himself to thousands of families who had secured him as their physician during his life in the city, and was always kindly interested in the professional career of his companions in practice.

In January, 1824, he became a member of the Rensselaer Medical Society, and in 1828 was elected its president, serving two years. On retiring from this office in 1850, he delivered an elaborate address on the medical topography of the city of Troy. This address was published in the "Transactions of the State Medical Society," for 1851. In 1844 he was sent by the Rensselaer Society as a delegate to the State Medical Society, serving four years, and in 1850 was elected a permanent member of that society, after which time he took a prominent part in its proceedings. In 1857 he was elected its vice-president, and the following year, president. In 1858, as vice-president, he delivered an address on the registration of diseases, and furnished the society an accurate record of his practice for twenty-one years, carefully analyzed and tabulated, covering three hundred pages of the published transactions, and comprising statistics of thirty-seven thousand eight hundred and seventy-two cases. In 1860 he presented another paper on the registration of diseases, including statistics of two thousand and fifty-six cases treated in 1858 and 1859. He was health officer of Troy for many years,

and chairman of the board of health. He early became a member of the Protestant Episcopal Church, and was for many years a vestryman of St. Paul's Church; at the time of his death was filling the office of junior warden. He was one of the earliest patrons of the Rensselaer Polytechnic Institute, and a trustee for twenty years. In the paper he was reading in the very last moments of his life he stated that all the property of the Institute was purchased by one of the committee in 1845, for less than five hundred dollars. We are informed of what his characteristic modesty did not allow himself to state, that he was the purchaser, and that he borrowed the money with which to purchase this property, which he eventually gave to the Institute.

He was married on September 24th, 1828, to Elizabeth Walsh, of Lansingburgh. This union proved eminently happy, and many times, when speaking of the prospect of death, he expressed no fear of dying, but much feeling at the prospect of leaving his wife. Three children were the result of this union; one died in infancy; his son, Horatio Walsh Brinsmade, died at the age of twenty-one, just as he had completed a very thorough preparation for the practice of his father's profession, and the only remaining child, an amiable and accomplished daughter, died in 1860, leaving them childless. The death of these children cast a shade of melancholy depression which remained through his life. After their death, he seemed more devoted than ever to his profession, seeming to seek in his labors for the good of his race, that mental solace of which the loss of his children had deprived him.

Dr. Brinsmade wrote but little, but the few papers he published remain as evidences of his devotedness to his profession. His duties as a citizen were promptly and faithfully discharged, but in his own unobtrusive way and manner. The ordinary attractions of public life were lost upon him, but to every movement tending to make men better, physically, mentally, or morally, he gave his best efforts. He was one of the original trustees of the New York State Inebriate Asylum, having been appointed by the act granting the charter, March 27, 1857, and was elected each year from that time. While attending a meeting of the citizens of Troy, convened to raise funds for the Rensselaer Polytechnic Institute, of which he was president, and

while reading an important paper, his heart suddenly ceased to beat, and he passed from time to eternity on the 22nd day of June, 1868.

Hon. JAMES FORSYTH, LL. D., the seventh president of the Institute, was born in the town of Peru, Clinton County, New York, on the 8th day of September, 1817. His ancestors were of Scotch-Irish extraction, and came over in the emigration of the years 1719-1730, when about one hundred and twenty families from the north of Ireland settled at Londonderry, Chester, and other towns in southern New Hampshire. His parents crossed Lake Champlain in the year 1816, and settled on the banks of the Ausable river, pioneers in the wilderness. His father, Robert Forsyth, carried on an extensive business, held various offices, and met a premature death by drowning at Plattsburgh, in 1834. His mother was Sabrina, daughter of James Ramsay, of Grafton County, New Hampshire, and was a woman of superior mental force and culture. She died in 1864.

James Forsyth, the subject of this sketch, attended the common schools of his neighborhood, and prepared for college at the Keeseville Academy. In 1835 he entered the University of Vermont, and graduated in 1839. During this year he entered the law office of Simmons & Tabor, of Keeseville, as a student, where he remained until he was admitted to the bar, in 1842.

In the year 1843 Mr. Forsyth removed to Troy, N. Y., where he has since resided. Soon after he came to Troy he became largely interested, professionally, in the railroad interests then developing in the vicinity of Troy, and for more than fifteen years was largely identified with the litigation and legislation growing out of the same, together with other important matters, among which was the noted case of the contested seat of the Supreme Court judgeship, between Judge Wright and Judge Hogeboom. Mr. Forsyth, for many years, held the position of attorney and counsel for the Rensselaer & Saratoga Railroad Company and the Troy Union Railroad Company. Of the latter corporation he was the Secretary and Treasurer from the date of its incorporation until the year 1868. He was also a director, attorney and counsel of the Commercial Bank of Troy, from the year 1853 until its close during the war; also a director of the Troy City Bank in 1865. He was one of the

James A. Garfield.

incorporators and is now a trustee of the Union Trust Company of New York, and since the completion of the work in 1874, has been President of the Troy & West Troy Bridge Company.

When the war broke out in 1861, Governor Morgan appointed Judge Forsyth chairman of the War Committee of Rensselaer County, which committee raised and sent three regiments into the field. He was also appointed by President Lincoln a member of the Board of Enrollment, and was Provost Marshal of the district composed of Rensselaer and Washington counties, from July 1, 1864, until the close of the war. In the years 1868-1869 he was Collector of the United States Internal Revenue for the district. On the 13th day of September, 1881, he was appointed by Governor Cornell to the office of County Judge of Rensselaer County, in place of Judge Strait, deceased. In the year 1859 he went abroad with Governor Seward and Henry J. Raymond, passed the summer on the Continent, witnessing the battle of Solferino, in Italy, on the 24th day of June of that year. In 1870, after the opening of the Union Pacific railroad, he visited California.

Judge Forsyth has at all times manifested a strong interest in educational work. For many years he has been a trustee of the Troy Female Seminary and of the Rensselaer Polytechnic Institute, and is a firm advocate of the free school system. Since the year 1868, Judge Forsyth has been the President of the Rensselaer Polytechnic Institute, and has devoted himself especially to the scientific and technical education of young men for the profession of civil engineering. He received the honorary degree of LL. D. from the University of Vermont in 1882.

Married twice; two children living, one of whom, Robert Forsyth, was graduated at the Institute in 1869.

VICE-PRESIDENTS.

(IN ORDER OF APPOINTMENT.)

ORVILLE LUTHER HOLLEY, editor, was born in Salisbury, Conn., May 19, 1791; died at Albany, N. Y., March 25, 1861. He was graduated at Harvard University in 1813. He studied law in New York; practiced successively in Hudson, Canandaigua and New York City, and edited successively the *Anti-Masonic Magazine* in New York, the *Troy Sentinel*, the *Ontario Repository*, the *Albany Daily Advertiser*, and for some years edited the *State Register*. In 1853 he arranged and indexed twenty-three folio volumes, containing the papers of Gov. George Clinton. He was Surveyor-General of the State in 1838, and during the last ten years of his life was occupied in the office of the New York Secretary of State. He wrote a "Life of Franklin"; "Description of New York City," 1849. He held the office of vice-president of the Institute from 1824 to 1831.

THEODORIC ROMEYN BECK, M. D., LL. D., medical professor and author, was born at Schenectady, N. Y., August 11, 1791; he died in Utica, N. Y., November 19, 1855; graduated at Union College, 1807. He studied medicine under Dr. Hosack; obtained his degree in 1811, began practice in Albany, and in 1813 addressed the Albany Society of Arts upon the mineral resources of the United States, believed to be the first published systematic account of American minerals. Appointed in 1815 professor of the institutes of medicine, and lecturer on medical jurisprudence in the College of Physicians and Surgeons in Western New York; professor of medical jurisprudence at Fairfield Medical College in 1826–36, and from 1836 to 1840 professor of materia medica; professor of materia medica in the Albany Medical College, 1840–54; principal of the Albany Academy 1817–48; made president of the State Medical Society, 1829; a manager of the N. Y. State Lunatic Asylum, and in 1854 elected president. He was a member of many learned societies, and an earnest promoter of all philanthropic enterprises. His statistics

of the deaf and dumb, influenced the State Legislature to take measures for their education. He edited for many years the "American Journal of Insanity," and in 1823 published his famous work on "Medical Jurisprudence,"—a standard work in Europe as well as in America. He also published many addresses, reports, and contributed to scientific journals. See Memoirs by F. H. Hamilton, in Gross's Medical Biography.

He was a vice-president of the Institute from 1824 to 1826.

Hon. David Buel, Jr., was born in Litchfield, Conn., October 22, 1784. In 1797 his father removed to Troy, N. Y., which continued to be the place of his residence. He fitted for college in Troy, and joined the sophomore class in Williams College in 1802, and was graduated, with the reputation of being a good scholar, in 1805.

He studied law in the city of Albany, and was admitted as an attorney in the Supreme Court of New York in 1808, and as a counselor in 1811. He was appointed a judge of the county court in 1818, and for some years was the first judge. He was a member of the State Convention for revising the Constitution of the State in 1821, and for a number of years was one of the Regents of the University of the State. Even after the death of his father, he continued to sign his name David Buel, Junior. He died in 1860. Judge Buel was greatly beloved for his many excellencies, and his consistent christian character.

He was a trustee of Williams College from 1829 to 1847, and a vice-president of the Institute from September 2, 1829 to 1860.

Rev. N. S. S. Beman, D. D., was vice-president of the Institute from 1842 to 1845. *See Presidents, page 31.*

William Paterson Van Rensselaer, the second son of Hon. Stephen and Cornelia (Paterson) Van Rensselaer, was born in Albany, N. Y., March 6, 1805. His mother was a daughter of Judge William Paterson, of New Jersey. After graduating at Yale College in 1824, he spent four years in Europe, traveling extensively, and pursuing legal studies in Scotland and Germany. For a number of years after his return he resided in Albany, N. Y., and just across the Hudson River in Greenbush, N. Y., but the last twenty years of his life were spent in Rye, Westchester Co., N. Y., where he had a delightful home on Manursing Island.

Mr. Van Rensselaer inherited from his distinguished father many noted characteristics. Conspicuous among these was a true simplicity. Free from all pretensions, and eminently unselfish, he found his happiness in a life of retirement, and in unobtrusive but earnest efforts to do good. Genuine sympathy with works of christian benevolence was another inherited trait. He was an attentive observer of the great religious and philanthropic movements of the day, and a most liberal supporter of every worthy cause whose claims were brought to his notice. A man of noble impulses and clear convictions, he was no less decided in the rebuke of injustice and iniquity than in the approval of that which was good. The uprightness and elevation, the kindliness and generosity of his nature, his fine intellectual gifts and high culture, and withal an unaffected humility, the fruit of true religion, made him a marked example of a christian gentleman. He was a devoted member and officer of the church of Christ. He made profession of his faith in the Redeemer in early manhood, uniting with the North (now the First) Reformed Dutch church of Albany, in which he served for several years as a member of the consistory, and as a superintendent of the Sabbath school.

During the last twenty years of his life he was an elder of the Presbyterian congregation of Rye. Warmly attached to the church of his adoption, as to that of his fathers, he served it faithfully and intelligently, taking part in its councils and giving a hearty support to its benevolent enterprises. His interest in the church at Rye was peculiarly strong. A model of regularity in attendance upon public worship, in reverent and thoughtful attention to the preaching of the gospel, in devotion to the Sabbath school, in the oversight of the flock, and in works of charity, during a long course of years. His latest care was for the erection and completion of the new house of worship, to which he contributed very largely, and in which he placed memorials of several departed members of his family. The last stone was added to this building on the day of his own departure to enter the upper sanctuary.

Mr. Van Rensselaer was a man of prayer, a diligent student of the Bible and a firm believer in the doctrines of grace, which are precious to the faith of God's people. The fervor and the scriptural character of his prayers, the consistency of his life,

not less than his noble benefactions, will long be remembered with satisfaction and profit by his brethren in the church.

His death was sudden, but peaceful. Of nine children, four, with their mother, survive him. He married first, Eliza B. Rogers, and afterwards, for his second wife, Sarah Rogers, who survives him. He died in New York Wednesday, November 13th, 1872.

DR. THOMAS C. BRINSMADE was vice-president of the Institute from 1864 to 1868. *See Presidents, page 37.*

Hon. GEORGE GOULD was born in Litchfield, in the State of Connecticut, on the second of September, 1807. He was the fifth son of Judge James Gould. His genealogy shows an unbroken succession of educated gentlemen in both the paternal and maternal branches; and in the former he stood but the third remove from his English ancestors, whose descendants (of the junior branch,) are still extant in England, and one of whom is in actual occupancy of the ancient family estate of Pridhams-Leigh, in Devonshire, acquired by inheritance from the first Lord Ashburton, who, having married into the family, re-purchased the estate from the Crown after its escheat (in default of male heirs of entail,) about the close of the last century.

His great-grandfather, Doctor William Gould, was born in North Yawton, Devonshire, England, in 1693. He emigrated to this country in 1720, and took up his residence in Branford, Conn. His grandfather, Doctor William Gould, the younger, was born in Branford, in 1727, and his father, Judge James Gould, was born in Branford in 1770.

His father's sister, Elizabeth Gould, was the wife of the Hon. Roger Minott Sherman, and his mother (Sally McCurdy Tracy) was the eldest of four sisters, who were severally married to the Hon. James Gould, Judge of the Supreme Court of Connecticut; the Hon. Samuel G. Howe; the Hon. Theron Metcalfe, Judge of the Supreme Court of Massachusetts, and the Hon. Silas W. Robbins, Judge of the Supreme Court of Kentucky; while his eldest brother, the Hon. William Tracy Gould, became a Judge in the State of Georgia, and he himself a Judge of the Supreme Court of New York.

On the maternal side, his great-grandfather, was Eliphalet Tracy, of Norwich, Conn., and his grandfather was General

Uriah Tracy, for ten years a Senator of the United States from Connecticut, who died at Washington in 1807, and was the first person interred in the Congregational burial-ground at the national capital.

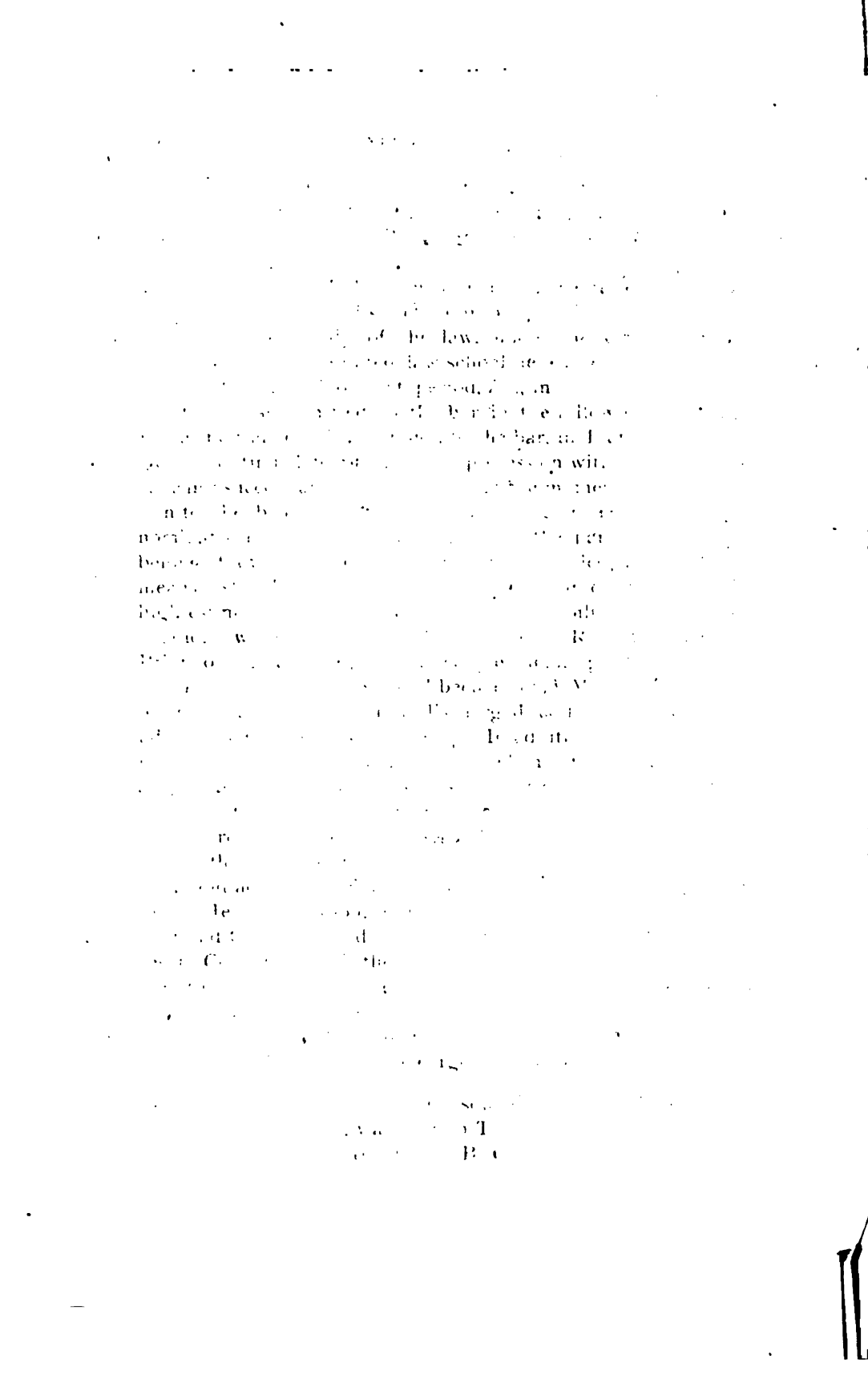
He entered Yale College in 1823, at the age of seventeen, and was graduated with distinction in 1827. He immediately entered upon the study of the law, under the teaching of his father, at whose celebrated law school he was a student for two years. At the end of that period, *i. e.*, in 1829, he removed to Troy, and was admitted to the bar in the following year, 1830. From the time of his admission to the bar, in Troy, in 1830, Mr. Gould continued to practice his profession with constantly increasing success and reputation up to the moment of his elevation to the bench of the Supreme Court in 1855. Although nominated for this judicial position by the party to which he belonged, the large vote by which he was elected was by no means a strictly party utterance, but rather an expression of the high estimation in which his professional ability and personal character were held by men of all parties in Rensselaer county. Prior to this, however, he had occupied many positions of trust and authority, and in 1852 had been elected Mayor of Troy, an office the duties of which he discharged with a rare degree of fidelity, energy and independence. In addition to the public offices held by Judge Gould, he occupied many semi-public posts, and many positions of great trust. He was for several years a director of the old Farmers' Bank of Troy, and at his death was a director of the Merchants and Mechanics' National Bank, and of the Troy Savings Bank. He was successively Vice President and acting President of the Rensselaer Polytechnic Institute. He was for a long time Treasurer of the Troy & Boston Railroad Company, and for several years a delegate to the Diocesan Convention of the Protestant Episcopal Church. He died early in the morning of Sunday, the sixth of December, 1868, at the age of sixty-one.

He was married November 10, 1840, at Troy, N. Y., to Sarah McCoun Vail, daughter of George Vail, of Troy.

EZRA THOMPSON GALE, C. E., son of Dr. Samuel and Mary (Thompson) Gale, Jr., was born in Troy, N. Y., April 27th, 1819. Mr. Gale and his brother, John B. Gale, are the living repre-

E. Thompson Gale

E. Thompson Gale



E. Thompson Gale

sentatives of one of the earliest New England families that came to Troy.

Mr. Gale received his early education in the select schools of Troy, and graduated at the Institute in 1837 as civil engineer. On leaving school he traveled widely throughout the United States, and returning to Troy, entered a mercantile establishment as clerk, and in 1840 became one of the firm of Brinkerhoff, Catlin & Gale, hardware merchants.

In August, 1841, he went to Europe and was occupied in traveling there until November, 1842. In February, 1843, the firm was changed to E. Thompson Gale & Co., and so remained until 1853, when the name of Catlin & Sexton was adopted, and Mr. Gale became a special partner. The business thus conducted involved the manufacture as well as trade in articles of general hardware. In 1857 Mr. Gale's special interest was withdrawn, and a few years later his son, Alfred DeForest Gale, became a partner, and the firm name thereafter was Lane, Gale & Co. Alfred DeForest died March 30th, 1877.

Previous to his retirement from mercantile business in 1859, Mr. Gale had become interested in one of the oldest monetary institutions of Troy, being as early as 1850 a director of the Farmers' Bank, of whose board his father was a member for many years. In 1859 he became the president of this bank, and retained the position till 1865, when upon the consolidation of the Farmers' with the Bank of Troy—the two oldest banks in the city—under the name of the United National, he became president of the new institution, and held the position until he resigned it in 1885. The United National Bank, under the able management of Mr. Gale, won an exceptional reputation for soundness throughout the State. In 1848, when the Troy & Boston Railroad project was laid before the citizens of Troy, Mr. Gale was one of the first to appreciate the great local importance of the enterprise, and gave it the aid of capital and influence.

With the Troy Gas Light Company he has been interested from the beginning. He has also been vice-president of the Troy Savings Bank, for many years one of the most successful institutions of its kind in the country. Since 1859 he has been one of the most prominent directors of the Rensselaer & Saratoga Railroad Company, which during this period has extended its lines and has become of so much importance and value.

Mr. Gale was elected trustee of the Institute in 1860, and still holds the position. He has always been deeply interested in its prosperity and well being, as evinced by his willingness to devote his time, influence and means for maintaining its high standing and increasing its facilities for usefulness.

He married Caroline DeForest, a daughter of Benjamin DeForest, a prominent New York merchant—deceased in 1850—who died in 1864. Seven children, four living, one of whom, Edward Courtland Gale, was graduated at the Institute in 1883.

HON. WILLIAM GURLEY, C. E., son of Ephraim and Clarissa (Sharp) Gurley, was born in Troy, N. Y., March 16th, 1821. He received the best education afforded by the schools in this vicinity, and choosing the profession of a civil engineer, attended the Rensselaer Polytechnic Institute, from which he was graduated, with the usual honor, in 1839. After following the business of a surveyor for some years, he turned his attention to the manufacture of the instruments with whose use he was already familiar, learning the business in the shop of Mr. Hanks, then a well-known maker of surveying instruments and church bells, in the city of Troy. He remained five years with Mr. Hanks, and entered into partnership with Jonas H. Phelps, in 1845, and with him prosecuted the same business much more extensively for the next seven years, at the end of which time the firm was changed by the withdrawal of Mr. Phelps, and the accession of his brother, L. E. Gurley. The new firm, under the name of W. & L. E. Gurley, at once greatly increased their facilities, and for the past thirty years they have been by far the most extensive manufacturers of engineers' and surveyors' instruments in the United States. But few years of his mature life has passed free from the cares of public office, and he has ever been interested in, and a liberal contributor to, the educational and religious institutions of the city. For many years he was connected with the Young Men's Association, and in 1851 was elected its president. As alderman of his native ward, he served with general acceptance from 1860 to 1864, and as fire commissioner he helped, in 1861, to inaugurate the greatly improved system now so much approved in all our larger cities. In 1867 he represented the city of Troy in the State Legislature, and was a member of the committee on the

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William Gurley

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affairs of cities. As a recognition of the mechanical ability of Mr. Gurley, he was, in 1868, appointed by the Secretary of the Treasury to act on a commission, in connection with Prof. Henry and other scientific experts, in examining the best meter devised for determining the products of distillation, to be subsequently adopted by the department.

Mr. Gurley is one of the oldest trustees of the Rensselaer Polytechnic Institute, having been elected in 1855. He was secretary of this institution from 1861 to 1872, and has been vice-president since 1872. He has been a trustee of the Troy Female Seminary for many years, and in 1872, when its existence was imperiled, he appeared before the Common Council of the city, and obtained a resolution giving power to purchase the same within one year. By the personal efforts of himself and brother, the amount of fifty thousand dollars was raised and paid to the city within the specified time. He was one of the directors of the old Market Bank of Troy, until it was closed, and was elected president of the National Exchange Bank in 1877, and enjoying the confidence of the community as well as that of the stockholders, he was enabled to retrieve its losses and close up its affairs with a success which has been rarely witnessed in any similar undertaking.

Mr. Gurley married Maria R. Kenney, daughter of Cyrus Kenney, of Troy, N. Y. Five children.

SECRETARIES.

MOSES HALE, M. D., was born June 12th, 1780. He began the study of medicine with Dr. Josiah Kitridge, of Walpole, N. H. He came to Troy in 1804, and having obtained his license in that year, began practicing. He was deeply interested in the establishment of the Rensselaer Polytechnic Institute in 1824, and was its secretary at the time of his death. The University of Vermont conferred upon him the honorary degree of M. D. in 1825, and in the same year he was elected a corresponding member of the French Society of Natural History. He died January 3d, 1837. He was secretary from 1824 to 1835.

REV. ERASTUS HOPKINS, the second secretary, was pastor of the Second Presbyterian Church in Troy. He was installed September 13, 1837. He was brought up in Northampton, Mass., and came here from residence and ministerial labor in a Southern State. He was a man of genial manners, superior abilities and scholarly attainments, and a writer and speaker of decided excellence. His four years' service won for him the strong esteem and attachment of his people, who assented with reluctance to his release from the pastorate October 14, 1841, on the ground of ill health, and the need of rest and change. After his dismission, Mr. Hopkins had no other pastoral charge, though he did not, for a while, cease to preach. He resumed his early residence in Northampton, Mass., which he represented for a time in the State Legislature; and died there in January, 1872. He was appointed secretary of the Institute soon after he came to Troy, in 1837, and served until the time of leaving the city.

HON. ISAAC MCCONIHE, LL. D., was born in Merrimac, N. H., on the 22d of August, 1787. He was the youngest son of John McConihe, of that place, and was of Scotch descent. His grandfather was born in Argyleshire, Scotland, December 22, 1669, and in early life emigrated to this country and settled in the State of New Hampshire.

His ancestry can be traced back to the fourteenth century. In 1369 Sir Neil Campbell, of Lockhawe, Argyleshire, chief of the powerful clan of Campbell, married the sister of Robert Bruce, and from thence the Campbells of Argyleshire descended. Duncan Campbell, the grandson of Sir Neil, the founder of the Sept or Clan of the Campbells of Inverarve, according to a Highland custom, assumed the name of Donachie, or "The Macdonachi," which translated is "the Son of Duncan," his father's name having been Duncan. Some of his descendants dropped the name of "Campbell," while other branches or cadets, took the patronymic of Maconochie. In the old acts of Parliament, and in the old titles, the name is variously spelled, Maconchy, McConahy, McConihe. In 1661, Maconochy, of Inverarve, was second in command of the Earl of Argyle's army against the reigning house of Stuart, and he is frequently mentioned in the Earl's trial. The same year his estate and family titles were forfeited and attainted, and sold by the Crown. In 1668, after the Revolution, the attainder of the Earl of Argyle and his adherents was reversed, and Maconochy of Inverarve was paid a sum of money by the government in lieu of his estate at Inverarve. With this remuneration, the estate called Meadowbank, in Mid-Lothian, was purchased, and it has been in the family ever since.

The present representative and chief of the clan of the ancient line of Campbells and Maconochies, is Alexander Maconochie, with the title of Lord Meadowbank, residing on his estate near Edinburgh.

Isaac McConihe graduated with distinction from Dartmouth College in the class of 1812, and came to Troy, N. Y., the same year. He commenced the study of the law with Stephen Ross, a lawyer of high standing, with whom, after having been admitted to the bar in 1815, he formed a co-partnership for the practice of his profession. His health failing, in 1818, he travelled nearly two years through all the Middle, Southern and Western States and Territories. He had in view the selection of a place which offered more advantages for the practice of his profession. But failing to find one in accordance with his views, he returned to Troy, to make it his permanent home, and from that time identified himself with all the business interests and philanthropic enterprises of the city. Soon after his return

he was appointed a Justice of the Peace, which office he held ten years; also a Commissioner of Deeds and Examiner in Chancery.

He was, in 1828, appointed Judge of the Court of Common Pleas of Rensselaer County, and, in 1831, County Treasurer, which office he held for several years. He held the office of Postmaster under different administrations, from 1832 to 1842, and was for several terms one of the Supervisors of the County of Rensselaer. He filled with ability many positions of trust and honor, involving large responsibilities, being for many years a bank director, railroad director, president of the Troy Lyceum of Natural History, vice-president of the Troy Association for the Improvement of the Condition of the Poor; trustee of the Rensselaer Polytechnic Institute, trustee of the Troy Orphan Asylum, president and treasurer of a bridge company, and a turnpike company, vice-president, treasurer and trustee of the Troy Cemetery Association, senior warden of St. Paul's Church, Troy, &c., &c.

Judge McConihe, being a patron of the arts and sciences, received many appointments of honor. He was corresponding member of the New York Historical Society, fellow of the New York Academy of Arts and Sciences, honorary member of the New England Historical and Genealogical Society, honorary member of the Association for the Advancement of Science, and Doctor of Laws—the honorary degree of LL. D. having been conferred upon him by Racine College, Racine, Wis.

In 1826 he married Sarah S. Strong, daughter of H. W. Strong, of Amherst, Mass., and grand-daughter of Simeon Strong, Judge of the Supreme Court of Massachusetts. On the morning of October 26th, 1867, he was taken seriously ill, and died on the afternoon of November 1st.

HON. JOSEPH WHITE was born at Charlemont, Franklin County, Mass., November 18th, 1811. He was employed on his father's farm till the beginning of his eighteenth year, when he commenced the double task of teaching a district school and preparing for college. Mr. White pursued his preparatory studies at the academy in Bennington, Vt., entered Williams College in 1832, and was graduated in 1836 with one of the highest honors of the class. He then passed nearly a year as

a teacher in Bennington Academy, and next commenced the study of law in Troy, N. Y. At the commencement of 1839 he returned to Williams College and entered on the duties of a tutorship, which position he occupied with credit and acceptance for nearly two years. In May, 1841, he returned to Troy, was admitted to the bar, and entered upon the practice of his profession there. He was married to Miss Hannah Danforth, of Williamstown. In 1848 he was elected a trustee of the college. In the autumn of the same year he removed to Lowell, Mass., where he had the charge of a large manufacturing corporation for some years. He represented the County of Middlesex in the Senate during the session of 1857. In April, 1858, he was appointed bank commissioner, and served in that capacity till September, 1860. In March, 1859, he was elected treasurer of the college, and removed to Williamstown, January, 1860. In July of that year he received the appointment of Secretary of the Massachusetts Board of Education, and entered upon the duties of his office January 1st, 1861, which office he still holds. He has been trustee of Williams College from 1848. He was secretary of the Institute from 1842 to 1849.

STEPHEN WICKES, M. D., son of Van Wyck and Eliza (Herriman) Wickes, was born at Jamaica, Long Island, Queens County, N. Y., March 17th, 1813. He graduated from Union College in 1831, and the same year entered the Rensselaer Polytechnic Institute, where he studied chemistry and natural science one year. Received degree of M. D., from University of Pennsylvania in 1834, and practiced in New York one year, in Troy fifteen years, and since 1852 in Orange, N. J. Received honorary degree of A. M., 1868, from Princeton; honorary member and fellow of the Medical Society, New Jersey; fellow of American Academy of Medicine; honorary member New York State Medical Society; member of American Medical Association; life member and corresponding secretary New Jersey Historical Society. Wrote "History of Medicine and Medical Men of New Jersey," published in Philadelphia; "Living and Dying, their Physics and Psychics," published at Newark, N. J. Editor of publications of Medical Society, N. J., from 1860 to 1880; Memorial Volume First Presbyterian Church, Orange, N. J., 1870; Topography of Orange, 1859; Water Cure in Orange, 1861;

Memoirs of Thomas W. Blatchford, A. M., M. D., of Troy, 1866. He married, February 24th, 1836, Mary Whitney, daughter of Isaac Heyer, of New York. Two children was the result of this union, one of whom is now living. His wife died May 9th, 1838. He married again April 1st, 1841, Lydia Matilda, daughter of Joseph Howard, of Brooklyn, and widow of William H. Van Sinderen, M. D., of Brooklyn. They had three children, two of whom are now living. He was secretary of the Institute from 1849 to 1854.

Rev. John Bleecker Tibbits, A. M., son of George Mortimer and Sarah (Bleecker) Tibbits, was born in Hoosac, Rensselaer County, N. Y., January, 1827. He prepared for college at College Hill, Poughkeepsie, N. Y., which was under the direction of Charles Bartlett. Entered Sophomore Class of Union College in 1843, and was graduated in 1846. Was tutor in same institution from 1847 to 1848. He afterward studied theology, and was ordained deacon in the Protestant Episcopal Church in 1866. Was secretary of the Institute from 1854 to 1861, and trustee from 1849 to 1868.

Hon. William Gurley, C. E., was secretary of the Institute from 1861 to 1872. *See Vice-Presidents, page 45.*

William Howard Doughty, Troy, N. Y., son of Ezra Thompson and Harriette (Howard Hart) Doughty, was born in Troy, Rensselaer County, N. Y., September 11th, 1837. He was a student at T. I. D. Kingsley's Military School, West Point, from May, 1844, to April, 1847; Alger Institute, Cornwall, Conn., May, 1847, to April, 1851; Collegiate and Commercial Institute, New Haven, Conn., May, 1851, to April, 1855. September, 1855, he entered the Rensselaer Polytechnic Institute. He has never engaged actively in the practice of his profession. Has become identified with and holds at present the following positions in the corporate institutions of Troy named below: director Troy City National Bank, Troy Gas Light Company, Troy and West Troy Bridge Company, American District Telegraph Company, Troy & Bennington Railroad Company and Rensselaer & Saratoga Railroad Company; manager Presbyterian Church Home; trustee Troy Orphan Asylum, Troy Young Men's Association and Troy Savings Bank. In December, 1871, he was

elected trustee and secretary of the Rensselaer Polytechnic Institute, which position he still holds. Is now actively engaged as attorney and fiduciary agent in the management of estates and properties. In 1857 he united with the Second Street Presbyterian Church, of Troy. Is now an elder thereof, and superintendent of its Sunday School. April 7th, 1874, he married Alice Clarkson Crosby, daughter of Edward N. Crosby, by whom he has had five children.

TREASURERS.

HON. HANFORD N. LOCKWOOD was born in Brookfield, Fairfield County, Conn., April, 1788, and came to Troy from Danbury in 1809. Entering at once upon the dry goods business, for nearly forty years continuously he was a prominent Troy merchant. He was elected mayor of Troy, and served from March, 1850, to March, 1851. He served as treasurer of the Institute from 1824 to 1844.

With no ambition for public place, the few offices he consented to take were always forced upon him; but the duties, nevertheless, were discharged with faithfulness and intelligence. In more quiet positions than public offices; in the church, in cooperating in benevolent enterprises, in promoting societies to advance the morals and the comforts of the people, and in acting in concert with citizens to forward public enterprises deemed essential to the growth and prosperity of the city, Mr. Lockwood's tastes seemed to find more congenial employment; and in all these relations his counsel has been valuable and his means cheerfully bestowed.

While in active life his ruling ambition was to be a good merchant, in the broad and best sense of the term; and a business career of forty years, unquestioned for its fair dealing and strict integrity throughout, was at last crowned with ample fortune and the respect and entire confidence of his fellow citizens.

He died April 27th, 1875, aged 87 years.

THOMAS C. BRINSMADE, M. D., was treasurer from 1844 to 1847, and during this period was often obliged to advance funds of his own, and even at the risk of his own private property. *See Presidents, page 37.*

HON. DAY OTIS KELLOGG was born at Galway, Saratoga County, N. Y., in 1796. He came to Troy in 1815, as clerk in the store of A. & W. Kellogg & Co., and continued with them

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until 1851. He became senior partner in 1837. In the fall of 1838 he was chosen a member of the Assembly from Troy, and served usefully in the Legislature of 1839 as chairman of the committee on banks. He was tendered a renomination, but declined the honor.

In 1840 he served on Governor Seward's staff as adjutant-general. This position he occupied six years, until the close of Governor Wright's administration. In 1849, on the organization of the Board of Education of Troy, he was appointed a commissioner, and at the first meeting of the board was chosen president. Was elected mayor of Troy in March, 1850, and was appointed the same year by President Fillmore consul to Glasgow, and his acceptance of that position necessitated his resignation as mayor, which was tendered November 7th, 1850. Mr. Kellogg resigned the consulate in the spring of 1853. Returning to this country, he engaged in business in New York city. Deceased.

WILLIAM H. YOUNG, son of James and Mary (Gardiner) Young, was born in Troy, N. Y., November 3d, 1817. His father was born in Norwich, Conn., January 17th, 1782, and came to Troy in 1796, and was apprenticed to Col. Nathaniel Adams, a silversmith and jeweler. He retired from active business in 1837, and died October 26th, 1865, in his 84th year. At the age of fourteen, William H., having received such education as the high school of that day afforded, entered the employment of Robert Wasson, a retail dry goods dealer, at No. 253 River street, where he remained until the spring of 1833, when he was offered a position as clerk in the wholesale dry goods house of G. & C. Dauchy, No. 255 River street, which he accepted, and on the 23d of April, of that year, he entered upon the duties of his clerkship. In the winter of 1834 his employers permitted him to attend school, and he entered the Troy Practical School, Charles H. Anthony, principal, where he remained two quarters, at the same time attending to the opening and closing of the store and such errands as were required of him between school hours. In the spring of 1842 an opportunity offered of entering the book and stationery business, and he, together with a former schoolmate, Charles P. Hartt, purchased the stock of Zephaniah Clark, at the store No. 216 River

street, and entered upon an independent mercantile career, as the head of the firm of Young & Hartt. In the spring of 1851 his partner, C. P. Hartt, received the appointment of cashier of the Commercial Bank, of Burlington, Vt., which office he accepted, and entered upon his duties in the month of April of that year, Mr. Young purchasing his interest in the bookstore and continuing it in his own name until the spring of 1860, when he admitted into partnership B. D. Benson, under the firm name of Young & Benson. In the spring of 1866 the firm dissolved, Mr. Benson retiring. From 1866 Mr. Young continued the business alone until March, 1869, when he associated with him Frederick Blake, under the firm name of Wm. H. Young & Blake. In March, 1875, Mr. Blake withdrew from the firm and Mr. Young again assumed the management of the business, and is now actively engaged in its details.

Mr. Young has been honored with a number of important positions, one of which was that of president of the Troy Young Men's Association, to which he was elected in December, 1853, after having served a term each as third, second and first vice-president, successively. At the present time he is one of the trustees of this institution, under its new State charter. In 1848 he was elected a member of the old Board of School Commissioners, and on the formation of the new board by a special law, enacted by the State in 1849, was elected by the Common Council commissioner to represent the second ward, which position he filled for eleven years, representing the second ten years and one year the eighth ward. In February, 1850, he was elected treasurer of the Rensselaer Polytechnic Institute, which position he has held for thirty-six years, and still retains. In January, 1868, he was elected a director of the Mutual National Bank, of this city, and is at this time one of its officers. In 1871 he was elected one of the trustees of the Troy Business College, in which position he remains at this date. He is also a director in the Troy & Albia Horse Railroad Company, which position he has maintained since 1871. In the year 1868 he was chosen one of the directors of Troy Citizens' Gas Light Company, which position he still retains.

TRUSTEES.

REV. SAMUEL BLATCHFORD, D. D., was the first trustee appointed by the Patroon November 4th, 1824. He served until 1828. *See Presidents, page 28.*

ELIAS PARMELEE, A. M., son of Hezekiah and Elizabeth (Cook) Parmelee, was born at New Haven, Conn., January 22d, 1774. He was graduated at Yale College about 1792. He married, in 1793, Eliza Trowbridge, who died the same year. In 1795 he was married to Fanny Fitch, of Windham, Conn. By this marriage there were twelve children—six sons and six daughters.

He settled in Lansingburgh, N. Y., about 1795, and lived there until his death in March, 1840. He was a most successful manufacturer of oils, soaps, etc. He was an officer in the masonic lodge of Lansingburgh; was one of the New York State Canal Commission about 1825; was elder in the Presbyterian Church over twenty years; was a large real estate holder, and erected many buildings, and was prominent in all local public works and questions. He was a trustee of the Institute from 1824 to 1834, being appointed in the beginning, with the first president.

JOHN CRAMER was born in Saratoga, May 14, 1779. His father, Conrad Cramer, was of German descent, who settled on a farm about three miles southwest of Schuylerville, before the revolution. During one of the raids by the Indians they were obliged to leave their home, and fled in a southerly direction. Near Schuylerville, night overtook them, and at that place there was a small house used for a tavern, but being already full, the Cramer family were obliged to remain in their wagon, and on that same evening the mother gave birth to John.

Young Cramer received a liberal education, and chose the profession of the law. About 1800, he opened an office in Waterford, and continued to reside in that village during the remainder of his long life. At an early age, he became an active politician; and, in 1804 was elected a presidential elector, and

voted for the re-election of Thomas Jefferson. He was elected a member of the State Assembly in the years 1806, 1811 and 1841. In 1821 he was a delegate to the State convention for framing a new constitution. In 1823, he was elected to the State Senate from the fourth district, which then extended to the St. Lawrence river. In 1832 he was elected a member of the House from this district, and in 1834 he was re-elected. He served in the House with James K. Polk and other distinguished men during the last term of Jackson's administration. John Cramer was a natural leader, and exercised a most powerful influence upon the politics of the State for more than fifty years, and for a longer period than any other one man.

He was elected a trustee of the Institute in 1824, and served until 1848.

He died at his residence in Waterford, June 1, 1870, aged ninety-one years and sixteen days. He left four sons and two daughters surviving him.

Hon. Guert Van Schoonhoven, son of Jacobus and Elizabeth (Clute) Van Schoonhoven, of Waterford, N. Y., was born July 6th, 1765. He was appointed trustee of the Institute November 5th, 1824, being one of the first eight selected by the patroon. Mr. Van Schoonhoven belonged to the family of this name who were early settlers in (Halfmoon) Waterford, N. Y. He was a very prominent and influential man, and held many important positions. He was appointed justice of the peace June 18th, 1792, by the provincial government, and reappointed by the State government, 1795, 1797, 1800, 1802, and in 1798 being assistant justice of the Court of Common Pleas. He was school commissioner from 1796 to 1799; was State Senator in 1815, and judge of the Court of Common Pleas in 1823.

He died in Waterford, N. Y., July 17th, 1847. He was a trustee until 1844.

Hon. Simeon DeWitt was born in Ulster County, N. Y., December 25th, 1756, and died at Albany, N. Y., December 3rd, 1834. He graduated at Queens College, in 1776. Joining the army of Gates, he was present at the surrender of Burgoyne; was assistant geographer to the army, 1780–83; chief geographer in 1780–83, and present at the surrender of Cornwallis; surveyor-general of New York, 1784 to 1834; appointed sur-

veyor-general of the United States in 1796, but declined. From 1798, regent; from 1819, vice-chancellor; and from 1829 chancellor of the State of New York. Member of many literary and scientific bodies. An "Elogium" on his life and services, by T. Romeyn Beck, was published in Albany in 1835. Author of "Elements of Perspective," Albany, 1813; Map of New York, 1804.

THEODORIC ROMEYN BECK, M. D., was trustee of the Institute from 1824 to 1828. *See Vice-Presidents, page 42.*

HON. JOHN D. DICKINSON, LL. D., one of the prominent men in Troy's early history, was the son of Dr. John Dickinson, of Middletown, Conn. He was born in 1767, graduated from Harvard in 1785, and a few years after emigrated to Lansingburgh, where he commenced the practice of law, and where he married Ann Eliza, daughter of Christopher Tillman. Josiah Quincey was his associate in college. Mr. Dickinson moved to Troy early in the present century, probably about 1808. In Lansingburgh he lived in the house in which A. A. Peebles now resides.

He was one of the trustees of the First Presbyterian Church of Lansingburgh, 1792; first president of the Farmers' Bank, 1801; a director and founder of the Rensselaer and Saratoga Insurance Company, 1814; was one of the agents of the canal commissioners, 1815, to secure donations of land for the Erie and Champlain canals; and was first president of "The Troy Lyceum of Natural History," in which he was greatly interested, and to which he contributed many valuable specimens. Prof. Amos Eaton was the originator in America of the present lecture system, and he projected and procured the incorporation of the Troy Lyceum, 1818, to disseminate knowledge of natural history and the sciences. Mr. Dickinson was one of the founders and members of the board of trustees of the Rensselaer Polytechnic Institute, 1824. He died on the 28th of June, 1841, aged 74 years, and his remains now repose in Oakwood Cemetery.

He was a member of Assembly from this county in 1816–17, and a member of Congress from 1819 to 1823, and again from 1827 to 1831. Mr. Dickinson was the president of the Farmers' Bank from its foundation to the day of his death, a period of forty years. When Mr. Dickinson moved to Troy he built and lived in the house now occupied by the Hon. George B. Warren,

Jr., No. 19 Second street. Mrs. George B. Warren, Jr., is a granddaughter of John D. Dickinson.

Judge Woodworth, in his Reminiscenses, says the Hon. John D. Dickinson was "a lawyer of learning, of sound judgment and extensive practice; his house was the seat of hospitality, graced by an accomplished wife, who made every visitor feel himself at home in their splendid mansion in Troy." When LaFayette made a second visit to Troy, on Friday, July 1st, 1825, he was honored with a public breakfast at the Troy House, and after that he called on the family of Hon. John D. Dickinson and received agreeable attentions at that hospitable mansion. When Henry Clay visited Troy in 1833 he received a public ovation at the Court House on Thursday, November 14th. Mayor George Tibbits welcomed him with an address, and an elegant double-barreled rifle, made by A. D. Cushing, was presented to Mr. Clay by Francis V. Yvonett, in behalf of the young men of Troy. Mr. and Mrs. Clay remained in Troy, the guests of Mr. and Mrs. Dickinson, until the following Monday.

JEDEDIAH TRACY was appointed trustee of the Institute November 5th, 1824, and resigned March 11th, 1825. He was an extensive manufacturer in Troy, a man of much enterprise and public spirit. He was a ruling elder in the First Presbyterian Church from 1818 to 1841, during the ministry of Rev. Dr. Beman. Has been dead for many years.

HON. RICHARD P. HART, son of Philip and Susanna (Akins) Hart, was born February 11th, 1780, at Hartsville, Dutchess Co., N. Y. As his parents were members of the Society of Friends, he was early instructed in the forms of that belief, and obtained a portion of his early education at the Friends' Academy, at Nine Partners, Dutchess county, and subsequently at Coopers. He went from home to the city of Albany in the year 1800, where he remained about a year. Thence he came to Troy, at that time a village of but a few years' growth. Here he found occupation in the counting room of Daniel and Isaac Merritt, the former of whom was his uncle. It was not long before he gave very satisfactory evidence of his superior capacity for managing the details of business. In 1803 he accepted an offer to connect himself, in a country store, with Benjamin Merritt, a

brother of Daniel and Isaac Merritt, at White Creek, Washington county. After remaining there three years he had acquired an amount of property which, in those days of moderation, was ragarded as a sound basis for the commencement of a business career. By this time, however, he had become convinced that his mercantile aspirations could not be limited by the possibilities of the trade of an inland village; hence it was that he desired to return to Troy, where had served his clerkship, in order that he might take his place among the merchants who were there engaged in business, and be allowed to give full exercise to his spirit of enterprise. An opportunity to gratify this was soon effected, and in 1806 he became connected with a prosperous mercantile firm then doing business in Troy. By the retirement or death of his partners, he soon became the head of this house.

Mr. Hart was self-educated, yet but few men could be found his equal in those pursuits to which he devoted the energy of his mind. As an accountant and financier he was highly gifted. Owing to his energy, public spirit, intelligence, and executive ability, his services were sought in connection with almost every important enterprise in this vicinity. The Bank of Troy was incorporated in 1811, with seventeen directors, of whom seven were from Troy, five from Lansingburgh, and five from Waterford. Mr. Hart was one of the representatives from the first-named locality. He was chosen a member of the first board of directors when the Rensselaer & Saratoga Insurance Company was incorporated in 1814 He was one of the corporators of the Troy Lyceum of Natural History, organized in 1818. From the time of the establishment of the Troy Female Seminary in 1821, he was a member of its board of trustees. He was a member of the first board of managers of the Troy Savings Bank, incorporated in 1823, and at their meeting for organization, held August 1st, 1823, was made first vice-president. The Rensselaer School, now the Rensselaer Polytechnic Institute, was established in 1824. Mr. Hart was interested in this institution from the beginning, and having been named as one of its trustees in the act of incorporation passed in 1826, he held that position continuously down to the time of his death, and was also an honored and valuable member of its prudential committee. By an act of the Legislature, passed April 14, 1832, corporate existence

was given to the Rensselaer & Saratoga railroad. Under this act an organization was effected in the following year, on which occasion Mr. Hart was elected president. The Troy City Bank was incorporated in 1833, and on July 10th, same year, after having been chosen a director, he was made president, and held that position till his death. He was one of the founders of the Troy Orphan Asylum, of which institution he was also a trustee. In 1821 he served as a representative in the Assembly of the State, from Rensselaer county, and as Mayor of Troy from 1836 to 1838.

He was thrice married. His first wife was Phœbe Bloom, daughter of Judge Bloom, of Bloomvale, Dutchess county, by whom had one child, who died at an early age. His second wife was Delia Maria Dole of Troy. His last wife was Betsy Amelia Howard, of New York city, by whom he had fourteen children. His death occurred at his residence, Second street, Troy, December 27th, 1843.

GEN. NICHOLAS FAIRLY BECK, A. M., brother of Dr. T. Romeyn Beck, was born in Schenectady, N. Y., in 1796. He received his education at the grammar school in his native place, and was graduated in 1813 at Union College, an institution which had been established a few years previously, principally through the exertions of his grandfather, Rev. Theodoric Romeyn, D. D. He published, in Albany, in 1827, a pamphlet of forty-eight pages, entitled "Considerations in Favor of the Construction of a Great State Road from Lake Erie to the Hudson River."

He died in Albany, N. Y., June 30th, while holding the office of adjutant-general of the State of New York. He was trustee of the Institute from 1828 to 1831.

JUDGE JESSE BUEL was born in Coventry, Conn., January 4th, 1778, and was the youngest of fourteen children. When twelve years of age his father removed to Rutland, Vt., and there, two years afterward, the lad, at his own request, was apprenticed to a printer. At the age of eighteen he purchased from his employer the unexpired term of his apprenticeship, worked as a journeyman, first in the city of New York and then in Lansingburgh and Waterford, and in 1797 commenced the publication of a political newspaper in Troy, called the Troy *Budget*.

He married in 1801, and made Poughkeepsie, N. Y., his resi-

dence, and there established a newspaper. This enterprise was not a success. He then went to Kingston, and there, in 1803, established a weekly paper, which he continued for ten years. By his great diligence in business and uprightness in conduct he obtained the public confidence, and for a time filled the office of judge of the Court of Common Pleas of Ulster County.

In 1813 Judge Buel removed to Albany and assumed the editorial management of the Albany *Argus*. The following year he received the appointment of state printer, and held that office until 1820, when he sold out his interest in the paper, disposed of his printing establishment, and, upon a small farm near Albany, commenced his eminent career as a practical agriculturist. There for nineteen years he was engaged in those experiments in agriculture and horticulture which have rendered his name famous throughout our Union and Europe.

In 1834 he commenced the publication of the *Cultivator*, and conducted it with great ability and success until his death. In addition to his contributions to that paper, he wrote and delivered many addresses before agricultural societies in his own state and elsewhere. He was chosen honorary member of many societies at home and abroad. For many years, at intervals, he was a member of the New York Legislature, and in 1836 was an unsuccessful candidate for the office of governor of the State. He was also one of the regents of the university.

Judge Buel died at Danbury, Conn., October 4th, 1839. He was on his way to Norwich and New Haven to deliver addresses to the Agricultural and Horticultural societies of those places. He died in the very field of his labors, in the midst of his usefulness, and in the full maturity of his mental faculties. He was trustee of the Institute from 1828 to 1835.

PHILIP S. VAN RENSSELAER, A. M., son of Stephen and Cornelia (Paterson) Van Rensselaer, was born October 14th, 1806, in Albany, N. Y. His preparation for college was made at the school of Mr. Bansell, in Poughkeepsie, N. Y. He entered Yale College, and there graduated with the class of 1826. He afterward studied law for two years, but was never admitted to the bar. After marriage he spent his winters in New York City and his summers at his wife's father's, at Poughkeepsie, N. Y. Here he devoted much time and attention to the culture of hot-house

grapes, often making fine exhibits of the same. He visited Europe in 1828, also in 1836. In 1855 he went abroad with his family and remained until 1863. From 1866 until 1870 he spent most of the time with his wife and younger children in California.

In 1839 he was married to Mary Rebecca Tallmadge, daughter of General Tallmadge. Five children. He died in New York City June 1st, 1871. Mr. Van Rensselaer was a man of somewhat retiring disposition, of a very sensitive nature, of elegant scholarly tastes, and of much culture and refinement. These traits of character were manifested to a marked degree in his fondness for the true and beautiful in literature and art. He was trustee of the Institute from 1833 to 1844.

Rev. Phineas Leeland Whipple, A. M., son of Jonathan and Lydia (Leeland) Whipple, was born in Grafton, Worcester County, Mass., January 6th, 1792. He graduated at Union College in 1816, and was admitted as an attorney in the Supreme Court of the State of New York May 14th, 1819. Practiced law for one year and then accepted the position of teacher in the Fairfield Academy at Fairfield, Herkimer County, N. Y. While there he took up the study of divinity. Was ordained a priest September 21st, 1823, by Bishop Hobart, in St. Paul's Chapel, New York City. He continued in the ministry till his death, which took place at Bath, Steuben County, N. Y., in 1844. Member of the New York Alpha of the Phi Beta Kappa. He married, May 20th, 1819, Alida Van Antwerp, daughter of Daniel Lewis Van Antwerp. Three children. He was trustee of the Institute for Lansingburgh from 1833 to 1837.

Jacob Lansing Lane, the oldest son of Col. Derick Lane, was born in Lansingburgh, N. Y., June 24th, 1794. After his father removed to Troy his education was such as the village of Troy afforded, and by means of it he received a preparation which enabled him to enter Union College at a very early age, where he was graduated in 1813. He soon after began the study of law in the office of Dickinson & Mitchell, and subsequently pursued his studies with the Hon. John P. Cushman. On June 2nd, 1818, he was admitted to the bar, and commenced the practice of his profession, being associated with Hon. William L. Marcy.

For many years he was actuary and secretary of the Troy Savings Bank, and it was owing, in a great degree, to his prudence and good judgment that the affairs were so managed as to win the confidence of the community and to place it in the front rank of similar organizations in the United States. At one time the entire fund of the Savings Bank, amounting then to over three hundred thousand dollars, was under his control; and it is a remarkable fact, due to the confidence reposed in him, that during the panic of 1837 there was no run on the bank and no alarm manifested by its depositors.

In the practice of his profession he seldom appeared in the courts, and his time was much occupied in the management of estates entrusted to his care.

For many years he was a director in several of the monetary, business and benevolent institutions of the city, and was always noted for the scrupulous care with which he discharged the duties of every trust committed to his keeping. Although energetic in conducting any business in which he was engaged, he was very methodical and painstaking in his modes of procedure, and was never an advocate, either in theory or practice, of that inattentive haste which is too often likely to end in mistake or error.

Mr. Lane was of a fine but massive build, of marked personal beauty, and was also distinguished for the amiability of his disposition and for his strong, practical common sense and sound judgment. On October 6th, 1818, he was married by the Rev. David Butler, D. D., to Caroline Elizabeth Tibbits, only daughter of George Tibbits. He died March 26th, 1859. He was trustee of the Institute from 1841 to 1842.

Rev. Eliphalet Nott, D. D., was trustee of the Institute from 1842 to 1845. *See Presidents, page 29.*

Hon. David Buel, Jr., was trustee of the Institute from September 2nd, 1829, when he was appointed second vice-president, until 1860. *See Vice-Presidents, page 43.*

Hon. Jonas Coe Heartt, son of Phillip Heartt, was born in Troy, N. Y., August 12th, 1793. He was a member of the class of 1811 in Union College. His life was closely interwoven with the interests of Troy; he grew up with it, and helped to make

it what it is. He was not a seeker of public positions, but was sought for as one peculiarly fitted to represent the city both at home and in the Legislature, where he was made speaker by a flattering vote. His connection with city affairs began in 1822, when he was elected assistant alderman for the second ward. He was also supervisor of this ward for 1833, 1835 and 1836, and in 1838 he was elected mayor, and re-elected each following year until 1843, when he declined the nomination.

It was through the united efforts of Mr. Heartt and Jonathan Edwards that Troy was made the terminus instead of a branch of the Hudson River Railroad. Mr. Heartt was instrumental in having a direct line of steamboats from Troy to New York, and for twelve years was a director in the River Steamboat Association. He was a director of the Troy & Boston Railroad from the time of its construction until his decease. He was the first president of the board of trustees of the fire department, and for many years was a member of the board of fire commissioners. After the death of Mr. Marshall, Mr. Heartt was made president of the board of governors of the Marshall Infirmary, and through his efforts a debt of eighteen thousand dollars against the institution was paid off in one year. Upon the formation of the Mutual Bank he was a director, which office he held, in connection with presidency of the Mutual Savings Bank, until his death. He was interested in the Rensselaer Polytechnic Institute, of which for years he was a trustee, and also of the Troy Female Seminary, of which he long was the honored president. With all these interests so beneficial to the city, he for more than forty years was actively engaged in the hardware business, which was founded by his father in 1798. Mr. Heartt was chosen a member of the vestry of St. Paul's Church on Easter Monday, 1831, and constantly until 1861, when he was chosen church warden. He was a member of that church for nearly fifty years, and aided it with wise counsel, active exertion and liberal contributions. He was a good friend, remarkably strong in his attachments and strictly honorable in all his business relations.

He was married August 30th, 1814, to Catherine Lamberson. Nine children. He died April 30th, 1874, aged 81 years. Trustee of the Institute, *ex officio*—being mayor of Troy—from 1842

to 1843, and was elected trustee in 1864, holding the position until the time of his death.

HENRY WRIGHT STRONG, A. M., son of Hezekiah Wright Strong, was born at Amherst, Mass., December 11th, 1810. He was a member of the first class that took a full course of study, and graduated at Amherst College in 1825. He was then fourteen and one-half years of age, and graduated with honors. Two years afterward, in 1827, he came to Troy and became a student of the law in the office of the late Judge Isaac McConihe. In 1830, at the January term, he was admitted to the bar, and immediately opened an office in Troy for the practice of law, where he remained until his death, and where he rapidly rose in his profession and ranked among the most eminent of the Rensselaer county bar.

Early in life he took a deep interest in politics, and was a strong advocate of Democratic principles, his addresses and writings being characterized for that maturity of judgment, correctness of thought and ripe scholarship more common to men of ripe years. While yet only twenty-five years of age he was appointed recorder of the city of Troy, which honorable position, for one so young, he filled with ability and to the satisfaction of the people for six years. For five years he represented Troy in the State Senate, a part of which time he was chairman of the judiciary committee. In the constitutional convention of 1846 he was one of the secretaries. For one year he was president of the Young Men's Association of Troy, and was one of the founders of that time-honored institution. As a speaker, Mr. Strong was ready, dignified, forcible and earnest. As a writer he was clear, terse and correct.

While a member of the Senate he married Sarah Elizabeth, daughter of Latham Cornell, of Troy. Two sons were born to them, both now dead. Mr. Strong died February 28th, 1848. He was trustee, *ex officio*—being recorder of Troy—from 1842 to 1844.

DANIEL G. EGLESTON was trustee, *ex officio*, of the Institute during his term of office, 1842 to 1844, as alderman of the fourth ward of the City of Troy, in accordance with laws of 1835 (N. Y.) page 296. *See page 19.* The Institute was situated in the above ward.

REV. N. S. S. BEMAN, D. D., LL. D., was trustee of the Institute from 1842 to 1865. *See Presidents, page 30.*

REV. WILLIAM BUEL SPRAGUE, D. D., was born at Andover, Conn., October 16th, 1795. He was fitted for college, partly at Colchester Academy, under Mr. John Adams, but chiefly under the Rev. Abel Abbot, of Coventry. He entered Yale College in 1811 and was graduated in 1815. He then passed nearly a year as a private tutor in Virginia, joined the Theological Seminary at Princeton in the autumn of 1816, and was licensed to preach by the Tolland Association in the summer of 1818, but did not leave the seminary until the next spring. From the seminary he went to West Springfield to preach as a candidate for settlement, on the recommendation of President Kirkland, of Cambridge, and Dr. Samuel Miller, of Princeton, and was ordained there, colleague with the Rev. Dr. Lathrop, August 25th, 1819. After a pleasant and successful pastorate there of ten years, he was dismissed and installed pastor of the Second Presbyterian Church in Albany, the 26th of August, 1829.

Dr. Sprague was in the pastoral office for over half a century, and was one of the most remarkable literary men in the line of patient achievement that this country has ever produced. His "Annals of the American Pulpit" is a monument to the earnest heroic toilers of our early ministry, which will embalm their memory through the future ages, and at the same time perpetuate the name of the patient builder. But the chief feature of the undertaking is the age of the writer when he began it, after he had passed his fiftieth year, when most men begin to decline, he began the great achievement of his life.

He was trustee of Williams College from 1831 to 1834, and trustee of the Institute from 1842 to 1844.

JOHN HOLME was born in England, and died in Lansingburgh, N. Y., August, 1870. He was appointed trustee of the Institute from Lansingburgh in 1842, and held the office until 1856. He was a successful manufacturer, and a man of much public spirit and enterprise. He was twice married. His first wife was Miss Van Schaick, and his second Anne B. Allen. No children.

REV. ALVA TABOR TWING, D. D., was born in Topsham, Vt., in 1811. After attending Kimball Union Academy at Meriden, N. H., he entered the University of Vermont, where he remained two years. He studied theology at Burlington, Vt. Bishop Hopkins ordained him as deacon in 1836, and as a priest a year afterward. Dr. Twing's first pastoral charge was at Vergennes, Vt., where he was rector for a year and a half. He then took charge of Trinity Church, West Troy, N. Y., and next, in 1840, of Trinity Church in Lansingburgh, where he remained for twenty-three years. Dr. Twing entered upon mission work in 1864 as associate secretary of the committee for domestic missions of the Episcopal Church. On the death of the secretary Dr. Twing succeeded to his place, which he had since retained. The degree of D. D. was received by Dr. Twing from Hobart College.

He died at his home in New York City, of fatty degeneration of the heart, November 4th, 1882. He left a widow, a son, the Rev. Cornelius Twing, pastor of a church in Brooklyn, and a daughter, Mrs. Charles C. Chapin, of Bellows Falls, Vt. The funeral took place at Grace Church, New York, and in Trinity Church, Lansingburgh. The interment was in Trinity churchyard, Lansingburgh. He was trustee of the Institute from 1842 to 1868.

HON. ISAAC MCCONIHE, LL. D., was trustee of the Institute from 1842 to the time of his death, November 1st, 1867. *See Secretaries, page 50.*

HON. GURDON CORNING was a native of Connecticut, and when young served an apprenticeship as a druggist in New London, Conn. In 1802 he set out on horseback to seek his fortune in the far West. He resolved to settle in Troy, and became the first regular apothecary in town. He continued in business in his original location, nearly opposite the Troy House, about twenty-five years. In 1809 he built himself a residence on the corner of what is now Broadway and Fourth streets, and occupied it until his death. On retiring from the drug business he became interested with Jedediah Tracey in the manufacture of cotton goods at Albia. Afterward he became one of the firm of Cook & Corning in manufacturing glass at Redford, Clinton County, the only crown glass manufactory in the interior of the

country. After having an interest in this concern about ten years, he retired from business. He was three times elected mayor of Troy, and served from 1843 to 1847. As mayor he was extremely energetic and watchful of the interests of the city, and was a very popular magistrate. He was prominently identified with the First Presbyterian Church.

He died July 4th, 1853, in the 75th year of his age. He was trustee, *ex officio*, being mayor of Troy, from 1843 to 1847.

Rev. Reuben Smith, A. M., was born in Bolton, N. Y., and was installed pastor of the Presbyterian Church in Waterford, N. Y., May, 1831. Two very memorable revivals occurred while he was connected with this church; one in March, 1843, fifty additions being made to the church. He was pastor for nearly seventeen years, resigning April 1st, 1848. He then returned to Ballston, N. Y., where he had lived for some years before coming to Waterford. He was afterward settled at Beaver Dam, Wisconsin, where he died in 1861 or 1862. He received the honorary degree of A. M. from Union College in 1816. He was trustee of the Institute from 1843 to 1845.

Hon. Abraham Baldwin Olin, LL. D., was born in Shaftsbury, Vt., September 21st, 1809. Was fitted for college at the academy at Williamstown, under Rev. Ebenezer Canning. Read law with A. G. Whittemore, and was admitted to the bar in 1840, when he formed a copartnership in the practice of the profession in Troy, N. Y., with his brother, Job Olin, Esq. Judge Olin served as a member of Congress for three consecutive terms, from 1857 to 1863, and did important service for the country as chairman of the house committee on military affairs during the first two years of the recent war. Was appointed judge of the Supreme Court of the District of Columbia in 1863 by President Lincoln. In 1865 Williams College conferred on him the degree of LL. D.

In December, 1838, he married Mary Danforth, daughter of Keyes Danforth, of Williamstown, Mass. In 1877 Judge Olin was stricken with paralysis, from which he never fully recovered. He died in Washington, D. C., in the year 1879. He was trustee of the Institute, *ex officio*, being recorder of Troy, from 1844 to 1848.

JARED S. WEED, son of Alsop and Clarissa (Swan) Weed, was born at Greenfield, Saratoga County, N. Y., May 3d, 1808. From 1842 to 1845 he was alderman of the fourth ward, also a member of the board of supervisors for 1846 and chamberlain of Troy in 1849. In 1850 was made president of the Troy Savings Bank, which he managed for over twenty years. He was one of the original founders and president of the Troy & Boston railroad. A valuable map of Troy was made by him. He was one of the originators of the Troy Cemetery Association, and trustee and secretary for many years. Married September 25th, 1835, Mary L. Norton, daughter of Sylvester Norton. One child. Died March 25th, 1876. He was trustee of the Institute, *ex-officio*, being alderman of the fourth ward, in which the Institute was located, from 1844 to 1845.

STEPHEN BOWMAN was trustee of the Institute, *ex-officio*, being alderman of the fourth ward from 1845 to 1847.

DR. THOMAS C. BRINSMADE was trustee of the Institute from 1844 to 1868. *See Presidents, page 37.*

WILLIAM PATERSON VAN RENSSELAER was trustee of the Institute from 1845 to 1849. *See Vice-Presidents, page 43.*

LUTHER TUCKER was born at Brandon, Vt., May 7th, 1802. At the age of fourteen he was apprenticed to a printer, of Middlebury, and accompanied him to Palmyra on his removal to that place. In 1825 he entered into partnership with Henry C. Sleight, at Jamaica, L. I., their business being chiefly the publication of standard works for New York houses. In 1826 he removed to Rochester, N. Y., and began the publication of the Rochester Daily *Advertiser*, being the first daily newspaper ever published west of Albany. In 1831 he established the Genesee *Farmer*, and in 1839 disposed of the Daily *Advertiser*. The succeeding year he removed to Albany and continued the Genesee *Farmer*. In 1846 he began the publication of the *Horticulturist*, and in 1853 the *Country Gentleman*, a weekly journal, the publication of which he continued until his death, which occurred January 26th, 1873. He was trustee of the Institute from 1845 to 1849.

HON. DANIEL DEWEY BARNARD, LL. D., was born at Sheffield, Mass., 1797, and died at Albany, N. Y., April 24th, 1861. He graduated at Williams College in 1818. His father, a native of Hartford, was a commissary in the Revolution. Daniel passed his youth on his father's farm, Ontario County, N. Y., but inclining to literary pursuits, was at fourteen years of age, deputy in the county clerk's office. After leaving college he studied law at Rochester, N. Y., and was admitted to the bar in 1821; was county attorney in 1826, member of Congress from 1828 to 1830 and from 1839 to 1845. He traveled in Europe in 1830 and 1831, and corresponded with one of the Rochester journals. He removed to Albany in 1832 and became a prominent member of the Whig party, serving in the New York Assembly. Was United States minister to Prussia from 1849 to 1853. Many of his addresses, discourses and speeches have been published. In 1839 he read before the Albany Institute "An Historical Sketch of the Colony of Rensselaerwick," which was published. He was a constant contributor to the Whig *Review*. The colleges of Geneva and of New York conferred on him the degree of LL. D. in 1855. He was trustee of the Institute from 1845 to 1850.

JAMES DANA, son of Stephen W. and Esther (Rumsey) Dana, was born at Poultney, Rutland County, Vt., July 18th, 1813. He was alderman of the fourth ward, Troy, N. Y., for a number of years, and trustee, *ex officio*, of the Rensselaer Polytechnic Institute two years, 1847 to 1849. Married, May 23d, 1837, Mary Jane Weed, daughter of Alsop Weed. Two children. He died September 7th, 1849. He was trustee of the Institute, *ex officio*, being alderman of the fourth ward, from 1847 to 1849.

FRANCIS NORTON MANN, A. M., son of Jeremiah and Lydia (Norton) Mann, was born in Milton, Saratoga County, N. Y., June 19th, 1802. Jeremiah Mann, the father of Francis N., was a farmer, and it was his earnest desire that Francis should follow the same occupation; but having more ambitious views than his father, and being naturally inclined to reading and study, Francis early resolved to acquire the advantages of a liberal education. During his boyhood, and until his eighteenth year, he worked upon his father's farm, attending the district school of the neighborhood some three months in the winter. But the

meager facilities of the common schools of the time did not satisfy his eager and inquiring mind; neither did they afford the necessary instruction required of a candidate for collegiate honors. To pursue this course it was necessary for him to leave home, and to this his father was strongly opposed, utterly refusing him any pecuniary aid in case he should do so, but generously offering him a fine farm should he remain. Francis had decided, and unaided and alone, the farmer-boy took the incipient steps toward accomplishing his own destiny. Some sixteen miles from the main homestead there resided, in the town of Charlton, Saratoga County, a Presbyterian minister whose name was Joseph Sweetman. To Dr. Sweetman, Francis resolved to apply for admission into his family, upon some terms whereby he could, in return for his services, receive at the doctor's hands such instruction as should fit him to enter college. On foot and alone he went to the residence of Dr. Sweetman, and the result of the interview was that Francis became a member of Dr. Sweetman's family for a period of two years. He then entered the Lansingburgh Academy, then under the care of George A. Simmons as principal. Here he remained one year, and on the 24th of June, 1823, entered the junior class of Union College. He was graduated on July 24th, 1825, and on October 4th, the same year, he entered upon the study of law in the office of Ashley Sampson and John Dickson, at Rochester, N. Y., supporting himself while there by acting as clerk. After leaving Rochester he continued his studies in the office of Daniel Cady, of Johnstown, and finally coming to Troy finished them in the office of S. G. Huntington, and was admitted to the bar as attorney and counselor of the Supreme Court at the August term, held at Utica in 1828. He immediately opened an office in Troy for the practice of his profession, which he continued during his life.

Judge Mann's official career began in 1835, when he was elected to the office of supervisor of the second ward of the city of Troy. He also represented this ward as supervisor in 1857, and was alderman of the second ward from 1844 to 1847. For five years, from 1840 to 1845, he was one of the judges of the Court of Common Pleas of Rensselaer County. In March, 1847, he was chosen mayor of the city of Troy, to which office he was three times re-elected by increased and flattering majorities.

Judge Mann during his long professional, official and business career was distinguished for his integrity, his carefulness, painstaking and vigilance as a business man. In early life he became a communicant of the Protestant Episcopal Church. He was one of the founders of St. John's Church in Troy, in the year 1830; was a member of the first vestry, and so continued all his life. At all times he took a deep and active interest in matters of religion and charity. On the 25th day of October, 1848, he married Mary J. Hooker, daughter of Marquis de LaFayette Hooker, of Poultney, Vt. She died July 28th, 1875, leaving three children. Judge Mann died February 8th, 1880. He was trustee, *ex officio*, being mayor of Troy, from 1847 to 1850.

STEPHEN WICKES, M. D., was trustee of the Institute from 1847 to 1854. *See Secretaries, page 53.*

HON. BENJAMIN PIERCE JOHNSON, A. M., son of William and Dolly Johnson, was born in Canaan, Columbia County, N. Y., October 30th, 1793. He was graduated at Union College in 1813, and received the honorary degree of A. M. from Hamilton College in 1819. He studied law and began the practice of his profession at Rome, Oneida County. N. Y., in 1817. Was a member of assembly in 1827, 1828 and 1829. He was elected president of the New York State Agricultural Society in 1845, and was corresponding secretary of same society from 1847 to 1869. He was appointed commissioner to the World's Fair in London, England, in 1851, and again in 1862, of which he prepared full reports, that were published. He was a member of the Auxiliary Society of National Industry, Rio Janeiro, of the Societe Nationale et Centrale d' Agriculture, France, Imperial Free Economic Society of St. Petersburg, member of the Committee of the Imperial Ministry of Domains of St. Petersburgh, and of the Society of Art, of London, England.

He was twice married, December 11th, 1820, and March 1st, 1838. He died April 12th, 1869. He was trustee of the Institute from 1849 to 1866.

ALEXANDER VAN RENSSELAER, A. B., (r. s.) M. D., son of Stephen and Cornelia (Paterson) Van Rensselaer, was born in Albany, N. Y., November 5th, 1814. His early education was received in his native city. He entered the Institute October,

1832, and graduated with his class October, 1833. After graduation, choosing medicine for his profession, he continued his studies in Philadelphia, where he received his degree, after which he removed to Edinburgh, Scotland, where for two years he enjoyed the advantages connected with the first medical school in Europe. Dr. Van Rensselaer never regularly practiced his profession; he passed many years abroad, devoted to travel and scientific pursuits. After his return to this country he settled in New York, and in 1853 was elected a member of the American Bible Society, but it was not this society alone which enjoyed the advantages connected with his hearty efforts. Influenced by the principles and teachings of the Bible, he was sincerely devoted to uplifting the ignorant in the Children's Aid Society, giving sight to those in the Asylum for the Blind, rescuing the poor street waifs in the Five Points Mission School, comforting the lame and crippled in the hospitals, acting the good Samaritan in his care for the sick and the destitute, and illustrating the principles of a true disciple and good citizen in his church and civil relations.

Dr. Van Rensselaer was present at one of the sessions, held at Saratoga June 18th, 1874, of the semi-centennial celebration of the Institute, and there expressed his deep interest in and good wishes for his alma mater.

Mr. Van Rensselaer was twice married. His first wife was Mary Howland, daughter of the late Samuel S. Howland of New York, who died about 1855, leaving two children, a son and daughter, who died at Nice, France, in 1859. His second wife was Louisa Barnewall, daughter of the late William Barnewall, of New York, whom he married June 30th, 1864. Three children.

Mr. Van Rensselaer died in New York city, May 8th, 1878, and was the last surviving son of the patroon. He was trustee of the Institute from 1849 to 1868.

JOHN WILKINSON, son of John and Elizabeth (Tower) Wilkinson, was born in Troy, N. Y., September 30th, 1798. He afterwards moved to Syracuse, N. Y. Two of his sons are graduates of this institution, of the classes of 1847 and 1849.

John Wilkinson was a man of much public spirit, and of much enterprise. He was a lawyer by profession, and was interested

largely in railroads, of which he was a most successful manager, and was connected with various monetary institutions. He did much for the development and building up of his adopted city, Syracuse, N. Y. He died September 19th, 1862. He was trustee of the Institute from 1849 to 1855.

HON. JOSEPH M. WARREN, A. M., was born in Troy in 1813. He represents a family which has, for three generations, been worthily known in local history.

Eliakim Warren, the original of the line, came to Troy from Norwalk, Conn., in 1798. The firm of E. Warren & Co., one of the earliest mercantile houses in the place, was composed of Eliakim and his three sons, Esaias, Nathan, and Stephen, the latter being the father of Joseph M. Warren. His father, Stephen Warren, was one of the most successful merchants of Troy, and identified as an originator or promoter with several of its most important industries. He was a man of rare public spirit and energy, and was highly esteemed in the community.

Mr. Warren fitted for college in the schools of the city, having attended the Institute as a student during Prof. Eaton's charge for about one year, 1827–28, and in his eighteenth year entered Trinity College, Hartford, Conn., where he graduated in regular course, in 1834. A business rather than a professional life was his choice, and when a young man he formed business connections, and his life has been devoted to mercantile pursuits.

Upon leaving college he entered a store in New York, and after less than a year of clerkship, with a general idea of commercial details, he returned to his native place and embarked in the wholesale grocery trade under the firm name of Rousseau & Warren. In 1840, after a flourishing business of several years, he established a large house in the hardware line, and in 1856 the well-known firm of J. M. Warren & Co. was formed.

Mr. Warren's life has been from the start a career of energy and development. While closely devoting himself to the advancement of his special industry, he has been an active co-operator in most of the movements of local improvement, and never refused to aid the progress of the city on any occasion that appealed to his judgment and ability. He was one of the original water commissioners of Troy, was a conspicuous worker

for the organization and construction of the Rensselaer and Saratoga Railroad, and acted as vice-president of the company during its separate existence. He was director of the old Bank of Troy, of which his uncle, Esaias Warren, was the first president, and since the union of that institution with the old Farmers' Bank in 1865, under the name of the United National Bank of Troy, has been a member of the consolidated board. He has also been a trustee and vice president of the Troy Savings Bank. In 1852 Mr. Warren was chosen Mayor of Troy. In November, 1870, he was elected to Congress from this district. He was elected trustee of the Institute in 1849, and still continues in office.

LE GRAND BOUGHTON CANNON, son of Le Grand and Esther (Boughton) Cannon, was born in New York city November 1st, 1815. He received his early education in the select schools of Troy, and at the Rensselaer Institute. After leaving school he went into the store of his father, and afterwards became a partner in the dry goods business. Later he was connected with the rolling mills and iron works in Troy. He moved to New York city in 1850, and has since been actively and largely interested in manufacturing, mining, railroad and other business enterprises. He married Mary Burbeck de Forest, daughter of Benjamin de Forest, of New York city. Five children. He was trustee of the Institute from 1849 to 1864.

DAVID THOMAS VAIL, A. M., was born September 18th, 1814, at Troy, N. Y. He graduated from Williams College in 1834,, and then succeeded to the mercantile business of his father, George Vail. He was married November 20th, 1830, to Phebe Bloom Hart, daughter of the late Hon. Richard P. Hart, of Troy, and passed a year in Europe. In 1847 he became director of the Merchants and Mechanics' Bank, of Troy, and in 1850 succeeded his father as president of the bank. Mr. Vail was extensively connected with different railroads and largely interested in several benevolent societies. He was trustee of the Institute from 1849 until the time of his death, which occurred after a long illness, February 5th, 1882.

HON. HIRAM SLOCUM was born in the town of Schaghticoke, Rensselaer county, May, 1802. His father was a farmer, and Mr. Slocum was bred to that occupation. In 1828 he was elected

justice of the peace in his native town. In 1836 he came to Troy, where he soon engaged in the wholesale produce and commission business, and continued it for about twenty years. As a Troy merchant he became widely known throughout the Western States, and acquired a reputation for integrity, honorable dealing, and for sagacity and bold strokes in his business ventures. He retired from business in this city in 1859, and soon after made his residence in the vicinity of the city of New York.

Mr. Slocum was a most useful citizen, always alive to local interests of every nature. The proposition to found the Troy University warmly enlisted his sympathies. He presided at the first public meeting called to advance the project, subscribed liberally in its aid, and gave much personal attention to interesting others in its behalf. He was also deeply interested in the Young Men's Association, of which he became an early life member. He was the steadfast and liberal friend of all the benevolent institutions of the city. He was a ruling elder in the First Presbyterian Church from 1838 to 1860.

Though taking a warm interest in political affairs, he never desired public office, but was elected alderman in 1838, and served two years. In the spring of 1856 he was elected Mayor, and devoted much time and careful attention to the duties of the office, and carried out many needed reforms in the city government. He was elected one of the trustees of the Institute in 1849, and served until 1865. He died April 2d, 1873.

ORSAMUS EATON, son of Abel and Azuba (Hurd) Eaton, and younger brother of Prof. Amos Eaton, was born at Chatham, N. Y., April 30th, 1794. He was for some years engaged in the manufacture of coaches and carriages at Hudson before coming to Troy. Here he engaged in the same business, and was burned out in the great fire of 1820. He was afterward the senior partner of the firm of Eaton & Gilbert, and in later years manufactured principally railway cars of all kinds for use in all parts of the United States, as well as for South America and other countries.

He married Susan McLean, half-sister of Uri Gilbert, Esq. By this marriage there were eight children, the late Mr. Edward O. Eaton of this city being his second son. He was a man of great energy and activity, and was the means of creating and of

bringing much business to Troy. He was a man of social nature, genial manner, and of broad intelligence. Mr. Eaton died in Troy, November 5th, 1878.

He was trustee of the Institute from 1849 to 1859.

REV. JOHN BLEECKER TIBBITS, A. M., was trustee of the Institute from 1849 to 1868. *See Secretaries, page 54.*

HON. JOSEPH WHITE, LL. D., was trustee of the Institute from 1850 to 1855. *See Secretaries, page 52.*

HON. DAY OTIS KELLOGG was trustee of the Institute, *ex officio*, being mayor of Troy, in 1850. He died August 8th, 1874. *See Treasurers, page 56.*

AMOS DEAN, LL. D., son of Nathaniel and Rhoda (Hammond) Dean, was born January 16, 1803, in Barnard, Vt. His father was born in Hardwick, Mass., April, 1767, and was among the early settlers of that town. Amos attended the district school some three months, during five successive winters, which enabled him to acquire the rudiments of a common school education. In his eighteenth year, while laboring upon the farm, he managed to acquire considerable knowledge of Greek and Latin. He also taught school during the following winter months, and the small means thus obtained enabled him to spend a few months at the academy in Randolph, Vt. In the autumn of 1825 Mr. Dean entered the senior class in Union College, and graduated in July, 1826. In the fall of that year he accepted the invitation of his maternal uncle, Hon. Jabez D. Hammond, author of the "Political History of New York," to remove to Albany, and to enter the office of the latter as a student at law. In the May term of 1829 Mr. Dean was admitted as an attorney in the Supreme Court of the State of New York.

He delivered the annual address before the Albany Institute in April, 1833, the subject of which was "The Philosophy of History." He was the first president of the Young Men's Association in the city of Albany. In 1840 he presided at a convention of the Young Men's Associations of the State of New York, held at Utica. In 1839 he had published in Boston, "The Philosophy of Human Life." He also published a very valuable work entitled, "A Manual of Law for the Use of Business Men."

On the 5th of October, 1840, he delivered before the State Agricultural Society an eulogy on the occasion of the death of the late Jesse Buel, which was afterward printed by the society. In July, 1840, he delivered the first annual address before the senate of Union College. In the fall and winter of 1838 and 1839 he was instrumental, with some others, in establishing the Albany Medical College, and received the appointment of professor of medical jurisprudence, on which he continued to lecture for many years. In 1840 he published a "Manual of Medical Jurisprudence," designed for the use of classes attending his lectures. On September 14th, 1842, Professor Dean was married to E. Joanna Davis, of Uxbridge, Mass. He died in 1868. He was trustee of the Institute from 1850 to 1853.

HON. HANFORD N. LOCKWOOD was trustee of the Institute, *ex officio*, being mayor of Troy, from 1850 to 1851. *See Treasurers, page 56.*

HON. JOSEPH M. WARREN was trustee of the Institute, *ex officio*, being mayor of Troy, from 1851 to 1852. *See page 78.*

HON. GEORGE GOULD, A. M., was trustee of the Institute, *ex officio*, being mayor of Troy, from 1852 to 1853. *See Vice-Presidents, page 45.*

HON. FOSTER BOSWORTH was born in Wilmington, Clinton County, Ohio, in 1821. He came to Troy with his father in 1837 and engaged with him in the grocery and provision business. In 1852 he was elected alderman in the first ward. Oakwood avenue was opened under his supervision. He was also one of the committee of the Common Council which negotiated the sale of the Troy & Schenectady Railroad. In March, 1853, Mr. Bosworth was elected mayor. In the spring of the same year he was appointed postmaster of the city. In the December following he resigned both offices and took up his residence in Brooklyn, but resumed his residence in Troy about 1870, where he still resides. He was trustee, *ex officio*, while mayor, in 1853.

Hon. ELIAS PLUM was born in the state of New Jersey Nov. 18th, 1804. He came to Troy June 20th, 1821, and opened a leather store on River street. It was before the day of railroads, and Troy had considerable wholesale trade from the

West and North. For many years Mr. Plum transacted a large wholesale business in leather and leather findings, and laid the foundation of his fortune. In after years Mr. Plum went into the tannery business, and his operations were extensive and successful. Mr. Plum was one of the originators of the Troy Commercial Bank, which was organized in 1838, and was one of the first board of directors. Two years after the bank went into operation Mr. Plum was made president, and he continued in that position until the bank closed up its affairs in 1862. The Commercial Bank during the greater part of its career, was one of the strongest in the city, and when it took advantage of the provision in its charter enabling it to retire from business, was in high credit and general confidence. The original stockholders received two dollars for every dollar of original investment, and were paid ninety per cent. in gold, which was then at a high premium. When the city owned the Troy & Schenectady road the Common Council annually chose the directors, but Mr. Plum was president of the road from its completion until it was sold to the city in 1852. He was one of the commissioners for laying out the track and depot buildings of the Troy Union Railroad Company, and for some years its president. Mr. Plum was an energetic and enterprising business man, and was always successful. His commercial ventures were often bold, but were supported by such careful industry and correct judgment of men and affairs that profit never failed him. In politics Mr. Plum was a Democrat, but he was one of the sternest opponents of secession and rebellion. In 1852 Mr. Plum was defeated by George Gould for the mayoralty of the city by a small majority. When Mayor Bosworth resigned in 1853, Mr. Plum was chosen by the Common Council to fill the unexpired term, from December, 1853, to March, 1854. Mr. Plum received the votes of twelve of the seventeen members present. He was twice afterward nominated for the position, but in a close vote Jonathan Edwards was his successful competitor in 1854, and Dr. Alfred Wotkyns in 1857.

Mr. Plum was for many years a trustee of the First Presbyterian Church, but of late years he had been a member of the congregation of St. Paul's Church. He was one of the strongest minds that ever had anything to do with the development of this city's prosperity. To unbending perseverance he added

strict integrity and sympathy with everything that tended toward the advancement of the welfare of the community. He died April 12th, 1883. He was trustee, *ex officio*, being Mayor of Troy from 1853 to 1854.

THOMAS WYNDEATT BLATCHFORD, A. M., M. D., son of the Rev. Samuel and Alicia Blatchford, was born in Toptham, Devonshire, England, in 1794. In infancy he came with his parents to America, they residing first in Bedford, N. Y., and shortly afterward at Greenfield Hill, Conn., to which place his father was called to fill the pulpit rendered vacant by Dr. Dwight's acceptance of the presidency of Yale College. We next find him preparing for college in the academy at Lansingburgh, N. Y., of which his father had charge, in connection with his labors as pastor of the United Presbyterian churches of Waterford and Lansingburgh. In October, 1810, he began the study of medicine in the office of Dr. John Taylor of Lansingburgh. In November, 1811, he entered Union College for special courses. In 1812 entered the office of Dr. Samuel McCauly, New York. In the winter of 1812–13 attended his first course of lectures in the "New Institution," Dr. Nicholas Romeyn being its president. In 1813 he matriculated at the College of Physicians and Surgeons, graduating in 1817. During this time he also visited Europe, and attended two courses of lectures, given by Sir Astley Cooper and Professor Cline, at the united schools of Guy's and St. Thomas' hospitals. He then practiced for a year in New York, nine years in Jamaica, Long Island, and removed to Troy in 1828. Here he engaged in a most extensive and successful practice for a period of more than forty years. Dr. Blatchford always cherished a high estimate of the dignity of his profession, and ardently engaged in its duties from higher motives than those of avarice and ambition. He appreciated its claims, and conscientiously met its manifold obligations. Dr. Blatchford was favorably known by his essays and papers published separately, besides many articles for newspapers, and papers contributed to medical and surgical journals. He was president of the New York State Medical Society; member of the American Association for the Advancement of Science; Vice-President of the American Medical Society; Corresponding Fellow of the Academy of Sciences, St. Louis, Mo.;

Fellow of the College of Physicians and Surgeons in New York, and subsequently President of the Alumni of that institution. He was also an honorary member of the State Medical Societies of Connecticut and New Jersey. In 1815 he received the honorary degree of A. M. from Union College. In contemplating the religious life and character of Dr. Blatchford, we find much that is deeply interesting and instructive. Favored with the unspeakable blessing of a pious parentage, special attention was given to his religious training. The great truths of the gospel were kept constantly and prayerfully in contact with his understanding and conscience, not only in their intrinsic greatness and importance, but also in their practical bearing upon his spiritual interests for time and eternity. He was known everywhere, in the highest style of character which any man can possess, that of a true christian. The many acts of beneficence he performed were prompted by the combined influence of feeling and duty. The circle of his benevolence embraced the whole family of man. To a life thus marked by consecration to the service of God, and unceasing devotion to the welfare of his fellow men, it is natural to anticipate a corresponding close. And in this we are not disappointed. The first decided inroad made upon his physical strength occurred in the spring of 1862, caused by his ineessant labors to relieve the wants of those who suffered by the great fire, which at that time devastated so large a portion of our city. But notwithstanding the gradual failure of his powers, from that time onward his activity and energy were such that he did not give up any of his duties, nor relax his usual diligence and promptness in his professional services. On December 23d, 1866, he was prostrated by an attack of intermittent fever, which resulted in typhoid pneumonia. After lingering fifteen days, the gentle spirit of the faithful servant of God was released from the sphere of his earthly labors.

In February, 1819, he married Harriet Wickes, daughter of Thomas Wickes, of Jamaica, Long Island, who with two sons and a daughter survive him.

He was Elder of the Second Presbyterian church, was connected with the Marshall Infirmary, was a member of the Board of Education for seven years, was a trustee of the Troy Female Seminary, and was a trustee of the Institute from 1854 till the time of his decease, January 7th, 1866.

HON. JONATHAN EDWARDS, A. M., was born in Hartford, Conn., September 27th, 1798. Jonathan Walter Edwards, his father, was the only son of the Rev. Jonathan Edwards, president of Union College, whose fame as a theologian and scholar is almost world-wide, and who died in office in 1801. Jonathan Edwards, the subject of this record, was educated at the grammar schools in Hartford and at Yale College, graduating at the latter institution in 1819. Soon after, he entered the office of Hon. Zephaniah Swift, and was admitted to the bar of Connecticut in 1824. For several years afterwards, Mr. Edwards was a practicing attorney at Hartford, and during part of that time was editor of the *Connecticut Union*, when George and Gideon Welles were editors of the Hartford *Times* and the *New England Review*. In 1834 he was appointed by the Legislature of Connecticut, Judge of Probate for the district of Hartford. In 1836 he was nominated on the Whig ticket for Secretary of State, but with all his associates on the ticket, was defeated. In 1837 he married Miss Maria Champion, of Troy, and soon after took up his residence here. For a number of years he was president and acting superintendent of the Troy & Greenbush railroad, and continued as such until the road was leased to the Hudson River Railroad company. In the fall of 1853 he was elected to the Assembly. The following spring (1854) he was chosen Mayor of the city ; he devoted much time to the office, and his care and vigilance were felt in every department of the city government. The following fall he was again elected to the Assembly, serving throughout the session with great advantage to the city's interests. On account of a severe domestic affliction, he terminated his residence in Troy in the spring of 1867, and removed to New Haven, Conn., where he resided at the time of his death, which occurred August 23d, 1875. He was a trustee of the Institute from 1854 to 1868.

HON. JOHN A. GRISWOLD was trustee of the Institute, *ex officio*, being Mayor of Troy from 1855 to 1856.

B. FRANKLIN GREENE, C. E., B. N. S., A. M., was trustee of the Institute from 1855 to 1859. *See Directors.*

HON. WILLIAM GURLEY, C. E., was elected a trustee of the Institute in 1855, and still continues in office. *See Vice-Presidents, page 48.*

HON. JONATHAN EUSTACE WHIPPLE, son of Jonathan and Lydia (Leland) Whipple, was born in Weathersfield, Windsor Co., Vt., in 1807. Was in the grocery business in Boston, Mass., then manufacturer of powder at Lowell, Mass., and manufacturer of oil cloths at Lansingburgh, N. Y. Was member of Assembly of New York about 1845; supervisor of Rensselaer County for several terms, the last 1863–64–65, and member of the American Scientific Association for the Advancement of Science. He was married in 1840 to Maria Viele. Died February 9th, 1866. He was trustee of the Institute from 1858 to 1866.

HON. HIRAM SLOCUM was trustee of the Institute, *ex officio*, being mayor of Troy, from 1856 to 1857. *See Trustees, page 79.*

HON. ALFRED WOTKYNS, M. D., was born in Walpole, N. H., September 7th, 1798. His father was a farmer. He was mainly educated by a private tutor, under whose charge he was placed at the age of thirteen. When nineteen years of age he came to Troy and entered the office of the late Dr. Moses Hale. In 1821 he was admitted to the practice of medicine, and became a partner of Dr. Hale; but not long afterward he removed to Philadelphia, where he read medicine one year with Dr. Nathaniel Chapman, and attended the lectures of the University of Pennsylvania, where he graduated.

He returned to Troy in 1822 and applied for the appointment of surgeon in the United States army, which he received from Mr. Calhoun, the secretary of war, and was ordered to Natchitoches, La., on the Red River, about two hundred miles above New Orleans. He was afterward ordered to Pensacola, Fla., where he remained two years as surgeon; then returning to Troy he reopened an office, and for the long period of over fifty years practiced his profession. He was president of the County Medical Society, frequently a delegate to the State Society; one of the originators of the Marshall Infirmary, and one of it governors. He was for sixteen years, from the beginning in 1852, president of the State Bank. He was elected mayor of Troy in 1857, which was known as the "panic year" for the whole country. In the discharge of his official duties he exhibited his characteristic business promptness, and the city

was able to meet all its obligations and to escape the extortions of money lenders, from which many other places suffered.

Dr. Wotkyns died December 23rd, 1876. He married for his first wife Mary Williams. Three children, one of whom married Dr. W. P. Seymour. His second wife was Eliza, daughter of Dr. Josiah Breakey, of Greenbush, N. Y. Five children. He was trustee of the Institute, *ex officio*, being mayor of Troy, from 1857 to 1858.

HON. ARBA REED was trustee of the Institute, *ex officio*, being mayor of Troy, from 1858 to 1860. Deceased. *See page 91.*

HON. JOHN FLACK WINSLOW was trustee of the Institute from 1860 to 1868. *See Presidents, page 34.*

E. THOMPSON GALE, C. E., was elected trustee of the Institute in 1860, and still continues in office. *See Vice-Presidents, page 46.*

HON. JOHN AUGUSTUS GRISWOLD, son of the Hon. Chester Griswold, was born in Nassau, Rensselaer County, N. Y., November 11th, 1818. He was educated for commercial pursuits, and when seventeen years of age entered the iron and hardware house of Messrs. Hart, Lesley & Warren, in Troy, N. Y. About one year after he accepted the position of bookkeeper in the house of Messrs. C. H. & I. J. Merritt, cotton manufacturers. With this firm he remained some time, living in the family of his uncle, Major General John E. Wool. Soon after engaging in business for himself, he became interested in iron manufacture, and that and banking formed his principal occupations. From this beginning in the manufacture of iron has grown up one of the largest and most successful establishments in the United States, now known as the Troy Iron and Steel Works.

Mr. Griswold entered political life as a member of the Democratic party, and in 1855 was elected mayor of the city of Troy. His democracy, however, never led him into opposition to the government, and upon the breaking out of the rebellion he at once placed himself firmly on the side of the country. In 1862 he was, as a War Democrat, elected to the XXXVIII Congress. Mr. Griswold was so attentive to his public duties and so patriotic in that time of his country's peril that he was, in 1862, re-elected to the XXXIX Congress, the Republican party

supporting him; serving during each term as a member of the committee on naval affairs. In 1864 he was re-elected a member of the XL Congress, serving on the principal committee of the House, that on Ways and Means. Not only by his construction of the original "Monitor," but by long service as an efficient member of the committee on naval affairs, he identified himself with the interests and success of the navy. In 1868 Mr. Griswold was nominated by the Republican Union State Convention for the office of Governor of New York. It is a well-known fact that his party claimed that he was fairly elected by a majority of the votes *actually* cast, and many honorable citizens of the opposite party admitted the fact. In the perilous hours when the Merrimac was being hastened on to completion, in the hope of destroying our navy, laying waste our cities and ending the war successfully for the seceding states, the genius of Ericsson was brought to the aid of the nation. But genius without money could avail nothing. The government had no means of its own to construct an ironclad. In this emergency individuals were found willing to risk their capital and their business reputation in constructing, at their own risk, the nondescript vessel. Conspicuous among those whose capital, general influence and business resources were relied upon to carry out the enterprise, was John A. Griswold and John F. Winslow, whose extensive iron mills and acquaintance with manufacturers enabled them to push forward the work, so that the "Monitor" was not too late in reaching the scene of her trial and her triumph.

Mr. Griswold died October 31st, 1872. He was married to Miss Elizabeth Hart, daughter of Richard P. Hart, Esq., of Troy, September 14th, 1843. Six children; three sons and three daughters. He was trustee of the Institute from 1860 to 1872.

Hon. Isaac McConihe, Jr., A. M., was born in Troy, Rensselaer County, N. Y., son of Isaac and Sarah (Strong) McConihe. He was a graduate of Hamilton College, New York, in the year 1849. Immediately after his graduation he embarked in business pursuits, and for the many intervening years has been extensively engaged in mercantile trade and in manufacturing, under the firm name of Isaac McConihe & Co. As a business man he is not only well but favorably known, and

has been eminently successful. Mr. McConihe has been prominently identified with many of the commercial interests of Troy for many years, and has always actively participated in local, civil and political matters. In 1853 he held the office of alderman of the first ward of Troy, and in 1860–61 he was elected to the honorable position of mayor of the city. In the incumbency of these offices, as in all other stations which he has been called upon to fill, he has been accredited with a faithful discharge of duty, and acquitted himself to the entire satisfaction of his constituency. So long a resident of Troy, and for so long prominently connected with her interests, in growth and prosperity, Isaac McConihe is justly entitled to a place among the representative men of the city of his birth. He is yet in the prime of manhood, with the promise of many years of activity and usefulness.

In 1866 Mr. McConihe was married to Phebe Warren, a daughter of the Hon. Joseph Warren, of Troy, N. Y. Three children.

HON. GEORGE BOWERS WARREN, JR., son of George Bouton and Mary M. (Bowers) Warren, was born in Troy, Rensselaer Co., N. Y., June 9th, 1828. He was educated at the Walters Episcopal Institute, Troy, N. Y., at College Hill, Poughkeepsie, N. Y., and Union College, Schenectady, N. Y., of the class of 1847. He was a wool merchant for about ten years, and has been interested in real estate in the West. He was elected Mayor of the city of Troy in 1861, and served the term of one year. Other civil offices have been offered him, which he has declined. Was president of the Young Men's Association of Troy, and has done much to forward its interests. Was married April 29th, 1856, to Eugenia Phebe Warren Tayloe, daughter of B. Ogle Tayloe, of Washington, D. C. Seven children, five of whom are living, one son being a member of the Institute at the present time. He was trustee of the Institute, *ex officio*, being mayor of Troy, from 1861 to 1862.

WILLIAM H. YOUNG was elected treasurer of the Institute in February, 1850, and a trustee in 1861, and still continues in office. *See Treasurers, page 57.*

HON. LYMAN WILDER, (Hoosick Falls, N. Y.,) son of John and Sarah (Kidder) Wilder, was born in Brattleboro, Windham Co., Vt., June 28th, 1798. He was a manufacturer, and a director in the Troy & Boston railroad for more than thirty years. He was a Member of Assembly at Albany for the session of 1854.

Mr. Wilder was a man of very great industry in business, was much interested in scientific matters, especially in geology and mineralogy, and made large collections of rocks, minerals and fossils, which in some respects were quite unique. His collections were purchased a few years since by Williams College, and now form a valuable part of their cabinet. He was elected a member of several scientific societies, and was a Fellow of the American Association for the Advancement of Science. He received the honorary degree of A. M. from Williams College in 1856.

He was married to Virtue Ball January 15th, 1829. She died February 18th, 1850. They had six children, two of whom are still living. He married again January 29th, 1851, C. Elizabeth Harwood. Three children, none of whom are living.

Mr. Wilder died at his home in Hoosick Falls, N. Y., September 22d, 1885, in his eighty-eighth year. He was elected trustee of the Institute in 1861, and served until the time of his death.

HON. ARBA READ was a son of Thomas and Hannah (Parsons) Read. His father was a Scotchman, who early settled in Troy, and led here a life of very considerable usefulness. He was a man of strong religious character. He acquired large wealth in the business of a brewer, and enriched his family. Arba was his third son. All the sons engaged in the same business with their father. Upon the death of his brother Rollin, and the removal of his brother Matthew to New York, he became the sole proprietor of their immense establishment in the city of Troy. He married a daughter of the late Stephen Allen, of New York, an eminent merchant and politician of that city. He was an active and public spirited citizen, and filled many positions of honor and trust. He was at one time mayor of the city, and discharged the duties of this position to the satisfaction of the citizens. He died at a relatively early age, leaving behind him a widow, three daughters and a son, all of whom have removed to the city of New York.

He was elected trustee in 1861, and continued in office until the time of his decease, which occurred July 3rd, 1863.

ALBERT EBENEZER POWERS, son of William and Deborah (Ball) Powers, was born at Lansingburgh, Rensselaer County, N. Y., December 5th, 1816. He prepared for the Rensselaer Polytechnic Institute in the public schools, and entered in the autumn of 1834, remaining about four months. Has been in the manufacturing business, as partner, since 1841; in banking since 1877.

He was married November 7th, 1839, to Frances Elizabeth Hanford, daughter of William Hanford. She died September 20th, 1850, and left a son and daughter. His second marriage, to Lucy Clark Allen, daughter of Rev. Joseph Allen, of Northborough, Mass., was on October 1st, 1857. One son. Was chosen trustee of the Institute in 1861, and still continues in office.

REV. PETER BULLIONS, D. D. (N. J. Coll., 1837), was born at Moss Side, near Perth, Scotland, December, 1791, and died at Troy, N. Y., February 13th, 1864. In his youth he worked on his father's farm and attended school. He spent three years at the University of Edinburgh; studied theology four years, sustaining himself by teaching in vacations, and was licensed to preach by the Presbytery of Edinburgh in June, 1817. He then married and came to the United States. In March, 1818, he was ordained pastor at Argyle, N. Y., and from November, 1824, until 1848, was professor of languages at the Albany Academy. From 1832 to 1852 he preached at Troy. He then visited Europe, and, after his return, resumed his pastorate over the United Presbyterians. He was an able preacher and instructor, and prepared a very complete series of classical text books, which are extensively used. Among them are, "Practical Lessons in English Grammar and Composition;" "Principles of English Grammar," 1834; "Introduction to Analytical English Grammar;" "Analytical and Practical English Grammar," 1850; "Progressive Exercises in Analysis and Parsing;" "Latin Grammar," "Latin Reader," and "Exercises;" "Cæsar," "Sallust," and "Cicero," with notes; "Latin English Dictionary, with Synonymes;" "First Lessons in Greek," "Grammar" and "Reader." He was trustee of the Institute from 1862 to 1864.

HON. JAMES THORN, M. D., was born at Colchester, England, July 20, 1802. He graduated at the Royal College of Surgeons, London, August 6th, 1824. After practicing in England, he came to the United States, and made his home in Troy in 1832. As said by his biographer: "His professional life in Troy was, until the insidious beginning of his fatal sickness, an eminent success. For more than a quarter of a century he carried the responsibilities of a large and important family practice in the city, and at the same time so far excelled in surgery as to stand much of the time without a rival in that specialty. Dr. Thorn's fondness for publicity and his great personal popularity naturally led him into politics and gave him success in that field. Besides minor offices, he twice occupied the position of Mayor of the city, having been elected in 1862, and again in 1864. His terms of office were full of more than ordinary labor and responsibility. The payment of bounties for soldiers during the early years of the war, and the relief afterward needed by the families of volunteers, made it his duty to control the handling of large sums of money, and the great fire of 1862 naturally placed him at the head of the committee for distributing relief to hundreds of impoverished families, yet no one found him guilty of selfishness or partiality, and no one believed that he was richer after his term of office." During the last ten or twelve years of his life he became gradually helpless, physically and mentally, and previous to his death he sought the care of the attendants of the Marshall Infirmary, where he died November 27th, 1871. He was trustee of the Institute, *ex officio*, being Mayor of Troy from 1862 to 1863.

HON. WILLIAM L. VAN ALSTYNE, son of Richard and Margaret (Schermerhorn) Van Alstyne, was born at Chatham Center, Columbia county, N. Y., October 25, 1822. Attended district school, Columbia Boarding School and Kinderhook Academy. He was clerk in a country store at Kinderhook from 1838 to 1844; merchant in Chatham from 1844 to 1851; book-keeper in Troy 1851; wholesale merchant from 1841 to 1867, at Troy, N. Y.; has also been engaged in the manufacture of knit goods and paper. Town clerk of the town of Chatham, 1846–47; school commissioner, Troy, 1857–58; alderman, 1858–59; mayor, 1863–64. Married, February 10th, 1847, Calsinai J. Johnson, daugh-

ter of Squire Johnson; six children, five living. Was trustee of the Institute, *ex officio*, 1863–64, while Mayor of Troy.

HON. JAMES THORN, M. D., was trustee of the Institute, *ex officio*, being Mayor of Troy from 1864 to 1865.

REV. DUNCAN KENNEDY, D. D., son of Robert and Annie (Kennedy) Kennedy, was born at Amsterdam, Montgomery Co., N. Y., May 16th, 1809; was brought up on his father's farm at Amsterdam, N. Y., and attended the academy at Johnstown, Fulton Co., N. Y.; entered Union College July, 1832, and was graduated July, 1835; was ordained to the ministry and installed pastor of the Presbyterian Church, Galway, Saratoga Co., N. Y., in 1839. After two years he became pastor of the North Reformed Church, Albany, N. Y., 1841; became pastor of the Second Presbyterian Church of Troy, N. Y., in 1855, which he resigned in 1867; became pastor of Westminster Presbyterian Church, Bloomfield, N. J., in 1870, and resigned in 1881, because of the infirmities of age. The degree of D. D. was conferred by the trustees of Hamilton College. Has published several sermons and addresses, and made between twenty and thirty speeches, during the war, of a patriotic character, in different places. Married December 14th, 1841, to Clarissa A. Spencer, daughter of Hon. Joshua A. Spencer, of Utica, N. Y.; four children. He was trustee of the Institute from 1864 to 1868.

HON. JONAS COE HEARTT was elected trustee of the Institute in 1864, and continued in office until 1874. *See Trustees, page 67.*

HON. GEORGE GOULD was elected trustee of the Institute in 1864, and continued in office until 1868. *See Vice-Presidents, page 45.*

DAVID COWEE, son of Farwell and Abigail (Merriam) Cowee, was born in Westminster, Worcester county, Mass., June 16th, 1818. He moved to Troy in the autumn of 1825, and his father opened a small hotel on the corner of River and Ferry streets, on the site now occupied by the new Troy armory. Here the boy assisted his father for some years, at the same time pursuing his education in the schools of Troy, and for a part of the time in a practical school, where he learned to write, tracing the let-

ters in a thin layer of sand. In the hotel he met many of the distinguished guests, among them Aaron Burr, and being an active, bright boy, received from them much praise and encouragement. On leaving the hotel, which had been much enlarged by his father, and the business much increased, he accepted a position upon one of the packets running upon the canal between Troy and Whitehall. After a short time he entered the drug store of John L. Thompson as a clerk, but was soon admitted to the firm as a partner, August 13th, 1835. This position he still holds, the name of the firm being changed soon after the death of the senior partner to John L. Thompson, Sons & Co. Mr. Cowee has held many important positions, of trust, is now one of the directors of the Manufacturers' National Bank, was at one time school commissioner, and has been ruling elder of the First Presbyterian Church of Troy since 1852.

He married, December 28, 1843, Mary Elizabeth Young, daughter of James Young of Troy. Five children, four living. Mr. Cowee was elected trustee of the Institute in 1865, and has for many years been a member of the executive committee.

ALEXANDER LYMAN HOLLEY, LL. D., was born at Lakeville, in Salisbury, Conn., on the 20th of July, 1832. His father, Alexander H. Holley, subsequently Governor of that State, was a native of the same village. His mother, whose maiden name was Jane M. Lyman, was from Goshen, Conn. For two or three years of his early boyhood he attended the district school near his father's house, and was then advanced to the Academy, to which he walked, a little more than a mile and a half, every day, winter and summer. In later life he was accustomed to allude to this regular exercise as having laid the foundation of the fine constitution which enabled him for so many years to work so hard and yet so easily. From the Academy in Salisbury he went to another under the care of Mr. Simeon Hart, at Farmington, Conn., and after a year or more, to Williams Academy, directed by Mr. E. W. B. Canning, at Stockbridge, Mass. From Stockbridge he went to Bridgeport, Conn., to prepare for Yale College, under Rev. Henry Jones. During this school period he manifested much interest in scientific matters, often making these the subject of his compositions. The steam engine attracted much of his attention, and his letters reveal his great

interest in machinery, and particularly in locomotives. .In 1850, Brown University having just established a scientific course, he entered that institution instead of Yale College.

During his collegiate course he made several important inventions and improvements in machinery. Although such inventions as these attracted much of his attention, he was active in the literary society to which he belonged. In September, 1858, he was graduated with the degree of Bachelor of Philosophy. His oration on "The Natural Motors" is, in point of style, not different from the fervid and florid efforts common to such occasions, yet it betrays throughout the passion of the speaker for locomotive machinery, terrestrial and marine; and two passages describing respectively a locomotive and a steamship, show with what assiduous affection he had watched what he described.

After leaving college, Mr. Holley entered the shops of Corliss & Nightingale, at Providence, R. I. They were at the time engaged in the attempt to apply to the locomotive engine the principles of the variable cut-off, so successful in the stationary engine. Holley entered their locomotive department, where he served both as draughtsman and machinist, and subsequently took the "Advance" out on the Stonington railroad, where he ran it as engineer long enough to show the practicability of so doing, and to effect a sale of the engine. But the detached variable cut-off was too delicate an arrangement to endure the jar of such rough service. An arrangement was afterward substituted; but this, too, rattled to pieces, and even in the form finally adopted the "Advance" was not practically a machine to be enthusiastically welcomed, particularly upon such road-beds as were then characteristic of America. He often alluded to the "Advance" and his experience in his public speeches.

While yet at Corliss's works, Mr. Holley had written both for the *Polytechnic Journal* and *Colburn's Railroad Advocate* articles on the Corliss engines, which displayed marked ability. Mr. Holley having purchased the *Advocate*, from April 19th, 1856, it was published by Holley & Co. In August of the same year the name was changed to *Holley's Railroad Advocate*, and for about a year the burden, both of editorial and business management, was borne by Mr. Holley. In July, 1857, the *Advocate* became Holley & Colburn's *American Engineer*, and in the following September was suspended and never revived. This suspen-

sion appears to have been caused by the "hard times" of 1857.

He then visited Europe to study foreign railway practice and to report upon those features of it which would be most important at home. This was the first of thirteen journeys across the Atlantic made by Holley, every one of which was fruitful of benefit to his country. Colburn and Holley's report appeared in 1858, under the title "The Permanent Way and Coal-Burning Locomotive Boilers of European Railways, with a Comparison of the Working Economy of European and American Lines, and the Principles upon which Improvements must Proceed." The book reflects great credit on its authors in many ways. After this he wrote a very large number of articles for the New York *Times* on subjects of great interest at that period. He also wrote many articles for the *American Railway Review*, of which he afterward became editor of the mechanical department. His connection with it began with its second volume, in January, 1860, and lasted about eighteen months. Iu 1860 appeared his valuable work on "American and European Railway Practice." During the war appeared articles upon iron-clad war vessels, iron-clad ships, and heavy ordnance.

In 1863 he was sent to Europe by Messrs. Corning, Winslow & Co., to obtain information concerning the Bessemer manufacture of steel. His mission was most successful. The Bessemer patents were purchased and subsequently combined with the conflicting American patents of Kelley. The works at Troy were built and started in 1865, and enlarged in 1867. From this time on the career of Holley was substantially the history of the Bessemer manufacture in the United States. In 1867 he built the works at Harrisburg, Pa. About a year later he was recalled to Troy, to rebuild the works here which had been destroyed by fire. Still later, he planned the works at North Chicago and Joliet, the Edgar Thomson works at Pittsburgh, and the Vulcan at St. Louis, besides acting as consulting engineer in the designing of the Cambria, Bethlehem and Scranton works.

His papers and addresses in the Institute of Mining Engineers, of which he became a member in 1872, and president in 1875; the Society of Civil Engineers, of which he was a Vice-President in 1876; the Society of Mechanical Engineers, of which he was a founder, and the British Iron and Steel Institute

and Institution of Civil Engineers, of which he was a member; and his report on iron and steel, contributed by him to the reports of the Judges of the Centennial Exposition in 1876; the series of illustrated articles on American iron and steel works, prepared by him for the London Engineering *News*, from 1877 to 1880; his masterly treatise on steel, published in 1880, in Appleton's Cyclopedia of Mechanics; and in another sphere, "Camps and Tramps," in Scribner's Monthly for May, 1878; and perhaps still more valuable and voluminous reports which he printed and issued to his clients on the various branches of steel manufacture; all these will be found a mine of clear, precise, well arranged and well discussed information.

It was probably about 1875 that his elastic strength began to fail. In June, 1875, he was appointed a member of the United States board for testing structural materials. In 1879 he accepted an appointment to lecture at the School of Mines, Columbia College, on the manufacture of iron and steel. He prepared these lectures with great care, printed a complete synopsis of them for the use of the students, and took as much pains to assure himself of the proficiency of his class by rigorous examination as if he had been a resident professor, and this his chief business.

Mr. Holley obtained sixteen patents; ten of these referred to his improvements in the Bessemer process and plant; two of them to roll-trains and their feed tables; the remaining two, first for a water-cooled furnace roof, and the latter for a steam-boiler furnace with gaseous fuel. The last of his Bessemer patents, purchased since his death by the Bessemer Association, that of the detached converter shell, is perhaps the most important of all, after the old converter bottom, patented August 9th, 1870.

It is pleasant to remember that in these later years he began to receive the public and professional recognition which his genius and perseverance deserved. In 1878, on the twenty-fifth anniversary of his graduation, his alma mater bestowed on him the honorary degree of Doctor of Laws.

Early in the autumn of 1881, he was attacked, during a professional journey in Belgium, with what he deemed to be a malarial ague. Unable to thrown it off, he went forward, nevertheless, with desperate resolution until he had completed, in

England and Scotland, the programme of the work he had laid out for himself. Relieved at last from this pressure, he gave some attention to his own condition, but soon concluded that he could not get well in London, and returned to this country, leaving his family, who had been traveling on the Continent, to follow a few weeks later. His malady subsequently proved to be an internal tumor, obstructing the gall duct, and producing many apparent symptoms of liver disease. Ever cheerful and hopeful, it was not until five days before his death that the certainty of a fatal termination was recognized by all. Mr. Holley's death occurred January 29th, 1882. He was a trustee of the Institute from 1865 to 1867, also from 1870 to 1882.

HON. URI GILBERT was trustee of the Institute, *ex officio*, being Mayor of Troy, from 1865 to 1866. *See Trustees, page 100.*

FREDERICK BALDWIN LEONARD, A. M., M. D., was born in Sharon, Litchfield county, Conn., July 13th, 1804. He graduated at Yale college in 1824. He was the son of Timothy and Mary (Baldwin) Leonard. He afterwards studied medicine, and at the time of his first marriage was a practicing physician. May 25th, 1835, he married Margaret Caroline, daughter of John Nichols. She died March 16th, 1851, leaving seven children. On October 12th, 1852, he married Ann Maria Stewart. Dr. Leonard was Professor of Botany and Zoology in the Institute from 1845 to 1848. He made extensive collections of plants and also of minerals. He died in Lansingburgh, February 9th, 1872. He was a trustee of the Institute from 1866 to 1869.

JAMES SOMERVILLE KNOWLSON, A. M., son of Richard J. and Margaret (Brown) Knowlson, was born in Albany, N. Y., May 1st, 1823. His father having removed with his family to Sandlake, Rensselaer county, in 1839, the son was sent to the school of Hon. Asahel Foote, at Williamstown, Mass., where he prepared for college. In the fall of 1839 he entered Williams College, and remained till the end of sophomore year. Deciding to pursue a mercantile life, he then came to Troy, N. Y., and engaged immediately in business. Until 1869 his attention was mostly given to the manufacture of cotton and woolen goods. He then retired from active business, but continued his residence in Troy. Mr. Knowlson has been connected with many

of the best institutions and enterprises of the city. In 1867 he received, but declined, the nomination for Mayor, from the Democratic party, then in the ascendency. He was elected ruling elder in the Park Presbyterian Church, and was for several years president of its board of trustees, and was also bank director. In 1843 Williams College conferred upon him the honorary degree of A. M., restoring him to his place on the roll of his class, which enabled him to serve, in 1865, upon the executive committee of the Society of the Alumni.

In April, 1846, he married Jane E. Kellogg of Troy, N. Y. He was elected trustee of the Institute in 1866, and still continues in office.

HON. URI GILBERT, son of Rev. John D. and Susan (Thomas) Gilbert, was born at Broadalbin, Fulton County, N. Y., July 10, 1809. His boyhood was spent at home, in the usual routine of school life. At the age of fifteen he came to Troy, and commenced learning the trade of carriage making with Orsamus Eaton, and in 1830 was admitted to a partnership with that gentleman. In 1862 Mr. Eaton retired from the firm. Mr. Gilbert has lived to watch the progress of American steam railroading from a mere experiment to its present wonderful proportions, and also has the gratification of knowing that the establishment of which he is the head has kept pace with that marvelous growth, and traces its origin to the modest little carriage works of sixty years ago.

In matters of local interest he is among the first to assist in enterprises tending towards the prosperity of the city or the educational institutions of its people. He was one of the organizers of the Young Men's Association of Troy, and for one year was its president. He officiates in the board of trustees of the Rensselaer Polytechnic Institute, of the Orphan Asylum, and is one of the governors of the Marshall Infirmary. In his business relations he was a director in the Farmers' Bank until its close, and has been a director of the United National Bank since its organization. Mr. Gilbert has devoted his life almost wholly to business pursuits. He has never been an active politician, yet always interested in local and national legislation. He was formerly identified with the Whig party, and has been unswervingly a supporter of the Republican platform. In 1840 he was

chosen to represent the Third Ward in the city council, which office he held continuously for seven years, except for 1845, and was elected Mayor of the city of Troy for the years 1865–1866, and again 1870–71. Mr. Gilbert is a man of wide breadth of thought in business matters, far-seeing and sagacious, and possesses that positive element as a characteristic which enables him to engage in large enterprises and carry forward to a successful completion whatever he undertakes. In 1832 he married Frances Harriet, daughter of Josiah Granger, of Schenectady; six children, four of whom are living. Was elected trustee of the Institute in 1866, and still continues in office.

Hon. David Ames Wells, LL. D., D. C. L., was born in Springfield, Mass., June 17th, 1823, and graduated at Williams College with the class of 1847. For awhile was assistant editor of the Springfield *Republican;* went to the Scientific School at Cambridge in 1849; was the first graduate of that institution; was made assistant professor in 1850, and instructor in chemistry and geology, at Lawrence Academy, Groton; followed the profession of practical chemistry, 1853–55, with Dr. A. A. Hayes, of Boston; was offered the chair of chemistry in Williams College on the death of Professor Laselle, and subsequently received a call to the same professorship at Marietta College, Ohio, and at Pittsfield Medical College. Mass.; in 1856 he patented several improvements in bleaching and preparing textile fibres; started Annual of Scientific Discovery in 1849–50, and edited the same annually until 1866, sixteen years; published, during the same time, some thirty volumes or pamphlets; edited also, during the same time, in part, the Pennsylvania *Farm Journal*, and made contributions to *Silliman's Journal*, Patent-office reports, Journal of Boston Society of Natural History, the American Association for Promotion of Science, &c.

He engaged in the general book and publishing business in New York in 1857–58, as a member of the firm of G. P. Putnam & Co.; took up his residence in Troy, N. Y., in 1858; married Mary E. Dwight, of Norwich, Conn., in 1859; visited Europe in 1862; moved to Norwich, Conn., in 1865, and from there to New York city and Washington, D. C., in 1866; was made chairman of United States Revenue Commission April, 1865,

and special commissioner of revenue July, 1866; was sent on a mission to Europe, by the United States, in 1867.

From 1865 to 1878, he was employed by the government as a commissioner to inquire into questions of revenue and taxation, and published fifteen reports on these subjects, some of which were reproduced in England, France and Germany. In 1870–73 he was employed by the Legislature of New York as a commissioner on taxation, and submitted two reports, with a plan of a code, all of which were republished in Europe. In 1872 he became lecturer on political science in Yale College. In 1873 he delivered an address in London at the annual banquet of the Cobden Club. In 1874 he was elected foreign associate of the French Academy of Political Science, in place of John Stuart Mill, deceased, and received the degree D. C. L. from Oxford University; a member of the Boston Natural History Society, American Geographical Society, Historical Society of Pennsylvania, and was a trustee of the Institute from 1866 to 1876. He now resides in Norwich, Conn.

Hon. John Lamson Flagg, A. M., son of John and Abigail (Hobbs) Flagg, and born at Nashua, N. H., on the 11th of September, 1835. Prepared for college at Troy, N. Y.; entered at Harvard University in 1853, and graduated in 1857; studied law in the office of Hon. David L. Seymour, at Troy; admitted to practice in 1858; married to Miss Ellen H. Brown, of Providence, in 1860; elected School Commissioner of the Third Ward of Troy, in the same year; manager of the Troy Young Men's Association in 1862, and President of that institution in 1863; elected Justice of the Justice's Court of Troy in 1862, and appointed by the Common Council as Police Magistrate of the city, holding that office until 1865; in 1866 elected Mayor of the city, and re-elected in 1867; elected to the lower house of the Legislature in 1868, and re-elected in 1869, 1870 and 1871, serving in 1869 as chairman of the committee of ways and means, and being a prominent candidate for the Speakership; serving in 1870 as chairman of the committee on railroads; a director of the Troy City Bank from 1864 to 1874. Died suddenly, on the 11th of May, 1874, aged thirty-eight years and eight months, leaving his wife and one son, and his aged father, surviving him. Such were the main events in the brief and

busy life of John Lamson Flagg. He was trustee of the Institute, *ex officio*, being Mayor of Troy from 1866 to 1868.

HON. CHARLES RUSSELL INGALLS, son of Judge Charles F. and Mary (Rogers) Ingalls, was born at Greenwich, Washington County, N. Y., September 14, 1819. He read law in the office of his father, was admitted to practice as an attorney in the Supreme Court and as solicitor of the Court of Chancery in 1844, and in 1847 was admitted as counselor of said courts. In 1853 he represented the First Assembly district of Washington county in the Assembly. He practiced law in Greenwich in connection with his father and brother until 1860, when he formed a law partnership with the Hon. David L. Seymour, and removed to the city of Troy. That relation continued until January 1, 1864, when he entered upon the duties of Justice of the Supreme Court of said State, to which position he had been elected the previous autumn. On January 1st, 1870, as Justice of the Supreme Court, he became a member of the Court of Appeals of the State, and remained in that court until its reorganization. In 1871, his judicial term of eight years as Justice of the Supreme Court being about to expire, he was nominated for the same position for the term of fourteen years, by both the Democratic and Republican Conventions, and was elected without opposition. In 1877 he was designated by Governor Robinson as a member of the General Term of the Supreme Court of the First Department, consisting of the city of New York, in which capacity he is now acting.

He married, in 1846, Mary E. Mosher, daughter of Dr. C. R. Mosher, of Easton, Washington county, N. Y. She died in 1848. In 1852 he married Mrs. Lorinda Stevens of Troy, who died in 1872. In 1880 he married Charlotte Marvin, daughter of Rev. Uriah Marvin, of Troy, N. Y. One child. In 1834 Judge Ingalls united with the Reformed (Dutch) Church at Greenwich. After he removed to Troy he united with the Second street Presbyterian Church, and is now one of its ruling elders. As a citizen, his interest in the welfare of the community is pronounced, and he is always earnest and efficient in caring for the sick and destitute, in forwarding measures best adapted for the relief of the poor, in organizing plans for the extension to all of the system of the free reading of

books and newspapers gathered in public repositories, and in originating and carrying to successful completion undertakings which are commended to the sympathy of man by their intention to exalt humanity. Of a cheerful disposition, courteous in demeanor, sharing with equanimity the burdens and trials of others, and never failing to distinguish the varied acts of his daily life by manifestations of the law of kindness, he emphasizes, with pronounced force, in his own career, the character of a christian gentleman. He was elected trustee of the Institute in 1868, and continues in office.

Rev. Marvin R. Vincent, D. D., was born at Poughkeepsie, N. Y., September 11th, 1834; he was graduated at Columbia College, New York, in 1854; subsequently he taught for eight years; during four years of the time he had charge of Columbia College Grammar School, in connection with the late Professor Anthon, and for the last year had almost the entire direction of the institution. In 1858 he came to the Troy Methodist University, as professor of Languages, where he remained four years, and then for one year was pastor of the Pacific street Methodist Church, Brooklyn, N. Y. He had entered the Methodist ministry two years before, in 1860, and his theological course throughout was private. On the 18th of June, 1863, he was installed pastor of the First Presbyterian Church of Troy, where he continued ten years. Having at length accepted a call to the Church of the Covenant, a leading Presbyterian congregation of New York, he was installed on the 8th of May, 1873. His predecessor in the pastorate was the Rev. Dr. George L. Prentiss, who was the founder of the church. Dr. Vincent received his degree of D. D. from Union College. He is joint author, with Professor C. T. Lewis, of a translation of "Bengel's Gnomon of the New Testament," in two large octavo volumes of about nine hundred pages each, published in Philadelphia. He has also published various sermons and addresses. Was trustee of the Institute from 1868 to 1870.

William Augustus Shepard, son of Abram and Sarah Shepard, was born in New London, Conn., January 28th, 1823. He was a most successful merchant in Troy for many years, and on retiring from business moved to Saratoga, where he now resides.

Was married October, 1846, to Martha M., daughter of George Vail, of Troy, N. Y. Seven children. Was trustee of the Institute from 1868 to 1883.

HON. FRANCIS S. THAYER was born at Dummerston, Windham county, Vt., September 11th, 1822. His father was a descendant of old Puritan stock, and the son Francis was one of a family of eleven children, among whom are Mrs. A. H. Graves of Troy, Mrs. William H. Cranston of London, England, the Hon. James S. Thayer of New York, and the Hon. Adin Thayer, ex-Canal Commissioner, of Hoosick Falls. In the summer of 1841 Mr. Thayer completed his education at Cambridge Academy, in Washington county; subsequently taught school in North Bennington, Vt., and in the spring of 1842 he came to this city, where he has since resided. Upon reaching Troy he accepted a clerkship in the flour store and milling firm of Howland & Bills. Mr. Thayer labored assiduously, with marked success, in his vocation, until a few years later, he was admitted into partnership with the firm named, and he had, without interruption, continued his connection with the business stated up to the time of his death. The name of the firm changed at different periods, but his interest in the establishment remained. Among the partners with whom he was associated may be mentioned the late James Howland, the late Alfonzo Bills, the late F. H. Knight, and John T Birge, who at present is the surviving partner.

In politics Mr. Thayer was formerly a Whig, casting his first vote for Henry Clay, but joined the Republican party upon its organization. In 1867 he was elected State Senator by a majority of 1600, running more than 500 ahead of his ticket in this county. He was re-elected in 1869 by a majority of 1196 over the Hon. E. Smith Strait, and during his connection with the State Legislature he served in important positions on the committees on manufactures, public expenditures, canals, commerce, and navigation. In 1870, Mr. Thayer voted against the odious Tweed Charter for the city of New York, and received the commendation and praise of the united Republican press of the State. In 1873 the deceased was nominated by the Republicans for Secretary of State, but, with his ticket, sustained defeat. In 1874 Mr. Thayer was appointed by Gov. Dix as Canal Auditor,

and served one year in that capacity. Since then, owing to failing health, he took no active part in either business or politics, but resided much of the time in Colorado, where he sought relief through the climate of that locality from the disease that finally terminated his life. The deceased was a member of the First Presbyterian Church of this city, and for many years held the office of a ruling elder. At the time of his death he was a director of the Troy City National Bank, and a trustee of the Troy Savings Bank, the Troy and West Troy Bridge Company, and the Troy Female Seminary. April 30th, 1850, Mr. Thayer married Miss Catharine McKie, of Cambridge, N. Y. Two children. His death occurred at Colorado Springs, Col., November 26th, 1880. He was trustee of the Institute from 1868 to the time of his death.

HON. JAMES FORSYTH was elected trustee of the Institute in 1868, and still continues in office. *See Presidents, page 40.*

JOSEPH WILTSIE FULLER, son of Orrin and Sarah Shaw (Wiltsie) Fuller, was born in Albany, N. Y., October 6th, 1821. He is the direct descendant of Dr. Samuel and Jeremiah Fuller, who came to this country in the Mayflower. He received his early education in the schools of Albany. He came to Troy March 18th, 1839, and took a position as clerk in the hardware establishment of Mann & Kendrick. He went into business for himself March 1st, 1844, and ten years later, in 1854, became the head of the well-known firm of Fuller, Warren & Co., manufacturers of stoves, ranges and furnaces. These are to be found in every state and almost every town in the country, as well as in foreign lands. It was with this house that the notable P. P. (Philo Penfield) Stewart was connected the later years of his life. He was not only the inventor of the stove which bears his name, but was a teacher, missionary, founder of a college, reformer, and philanthropist. His perfected stove was manufactured by Messrs. Fuller, Warren & Co., and over ninety thousand were sold in about thirty years.

Mr. Fuller has been strictly a business man, but at the same time has been ever alive to all matters relating to the educational and other interests of the city. He is at present president of the United National Bank, a director in the Savings Bank, and

an officer in St. Paul's Church. He married, November 21, 1844, Mary Elizabeth Wolfe, daughter of William H. Wolfe, of Troy, N. Y. Eight children, the oldest daughter the wife of Rev. Eliphalet Nott Potter, D. D., LL. D., President of Hobart College, Geneva, N. Y. Mr. Fuller was chosen trustee of Union College in 1872, and trustee of the Institute in 1868.

HON. WILLIAM KEMP, son of James and Elizabeth (Haggerty) Kemp, was born in Troy, N. Y., January 14th, 1829. His school days were closed at the age of nine years, but his subsequent life has fully demonstrated that although his opportunities for obtaining an education from books, while young, were very limited, he has been a successful student of general information, and possesses a sound, practical education, which has ripened with his years, until he ranks among the most intelligent and sagacious of the business men of Troy. During the remainder of his minority, he was found in various positions—a type-setter in the office of the Troy *Post*, as a clerk in a drug store at Watertown, N. Y., for two years, and for a short time as a clerk in a crockery store in Troy; as an apprentice, journeyman, and foreman of a machine shop, where he became not only familiar with every department, but was able to construct any part of a steam engine. On the site of one of the early manufactories of Troy, the old Troy Bell Foundry, Mr. Kemp, in 1851, in a small wooden shop, for which he paid an annual rent of twenty-five dollars, commenced the business of brass founding. With no capital worth mentioning, yet possessed of a determination to achieve success on his personal merits solely, he sought no outside aid, relying entirely upon his native energy and ability. His operations in this branch of manufacture have gradually increased in extent, and for many years has been among the most successful enterprises of Troy. Notwithstanding the cares of a rapidly growing business, and its heavy requirements upon his time and attention, Mr. Kemp has ever practically manifested an unselfish interest in educational progress. In 1855 he was elected a member of the Board of Education of Troy, which position he held until 1872, and for fourteen years of that time he was the presiding officer of that body. During the late rebellion, he was paymaster of the Second Regiment, formed in Troy. For two years he represented the Fourth ward of the

city in the Common Council, and from 1873 to 1775 was Mayor of the city. Mr. Kemp is interested in and connected with various other institutions of the city ; he has been for many years a trustee of the Troy Female Seminary, the Troy Orphan Asylum, and the Episcopal Church Home; president of the Citizens' Gas Light Company, director of the Troy & Boston R. R. Co ; the president of the Troy & Lansingburgh R. R. Co., and he was one of the originators, and is a director of the Citizens' Steamboat Company, organized in 1870. He was for many years a director of the Mutual National Bank, was for some time its vice-president, and in 1878 was chosen its president, a position he still holds. He is also president of the Mutual Savings Bank of Troy. He has been trustee of the Institute since 1868.

AZRO BUCK MORGAN, son of Justin and Sally (Durkee) Morgan, was born at Rochester, Windsor Co., Vt., January 24, 1824. In the early part of his life he was a merchant at Stockbridge, Vt. From about the year 1856 to 1870 he was associated with Messrs. John Kerr and James S. Knowlson in the wool trade, at Troy, N. Y. In 1870 he went to Chicago, Ill., and there resided until his death. His first marriage was at New London, N. H., May 5th, 1852, to Lucy Ann Whitmore Brown, daughter of John Brown. She died October 22, 1860. His second marriage was at Troy, N. Y., December 2, 1863, to Anna T. Phipps, daughter of Thomas Phipps. No children. Mr. Morgan died at Troy, N. Y., November 25th, 1878.

HON. MILES BEACH, son of William Augustus and Ann Eliza (Porter) Beach, was born at Saratoga Springs, Saratoga county, N. Y., October 13, 1833. He prepared for college with Rev. Mr. Smith, of Troy, N. Y.; entered Union College, September, 1851, and was graduated July, 1854. He entered upon the practice of law at Troy, N. Y., in 1855, and practiced the profession in New York from 1871 to 1879. Mr. Beach, while in Troy, held the offices of school commissioner and alderman, and was elected mayor in 1866. He removed to New York in 1871, and there practiced law; was appointed judge of the Court of Common Pleas, and acting judge of the Supreme Court of New York City. He was married, September 30, 1855, to Sophia F. Row-

land, daughter of Edmund Rowland, of Schenectady, N. Y. One child.

REV. J. IRELAND TUCKER, D.D. Rector of the Church of the Holy Cross, Troy, N. Y. Was elected trustee of the Institute in 1869, and still continues in office.

ALEXANDER L. HOLLEY, LL. D., was re-elected trustee of the Institute in 1870, and continued in office until the time of his decease in 1882.

CAPT. CLARENCE E. DUTTON, A. M., U. S. A., was born in Connecticut, and received his appointment to the army from that State. He was made first lieutenant and adjutant 21st Connecticut Volunteers, September, 1862; captain 21st Connecticut Volunteers, December, 1862; served with his regiment in the field, and engaged at the battle of Fredericksburg, seige of Suffolk, battle of Cold Harbor, action at Bermuda Hundreds, and battle of Drury's Bluff. He was appointed second lieutenant Ordnance Corps, U. S. Army, January, 1864; first lieutenant Ordnance U. S. Army, March, 1867; at Watervliet Arsenal, West Troy, N. Y., from January, 1865, to October, 1879; captain of ordnance, June 23d, 1874; at Frankford Arsenal from October, 1870, to November, 1871; at Washington Arsenal from November, 1871, to May, 1876; chief ordnance officer department of the Platte from May, 1876, to December, 1877; in the summers of 1875, 1876 and 1877, detailed for duty in connection with the geological survey of the Rocky Mountain region, in charge of J. W. Powell, and continuously detailed for duty with the U. S. geological surveys from January, 1878, to date; in 1879, also served as secretary of the commission for the revision and codification of laws relating to public lands.

In 1870, while a member of the board of trustees of the Institute Capt. Dutton was appointed as one of a committee of three to report on the system of instruction with proposed modifications. The report was printed in a pamphlet of about forty quarto pages, and gave evidence of careful investigation, thoughtful study, and contained many valuable suggestions. Was a trustee of the Institute from 1870 to 1876.

HON. URI GILBERT was trustee of the Institute, *ex officio*, being mayor of Troy from 1870 to 1871. *See Trustees, page 100.*

HENRY CHAMPION LOCKWOOD was born in Rochester, N. Y. Was elected trustee of the Institute in 1871, which office he still holds.

WILLIAM HOWARD DOUGHTY, C. E., was elected trustee of the Institute in 1871, and still continues in office. *See Secretaries, page 54.*

HON. THOMAS B. CARROLL was born at Coxsackie, N. Y., and from there came to Troy. During his residence in this city, he held various public positions—alderman, member of the common council, and was elected mayor of the city in 1871. He was Trustee of the Institute, *ex officio*, being mayor of Troy from 1871 to 1873. He now resides at Saratoga, N. Y.

HON. WILLIAM KEMP was trustee of the Institute, *ex officio*, being mayor of Troy from 1873 to 1874. *See Trustees, page 107.*

HON. EDWARD MURPHY, JR., was born at Troy, December 13th, 1838. Was educated at St. John's College. An ardent Democrat, he early commanded attention as a sagacious leader, and in 1864 was elected alderman of the First Ward. In 1875 he was elected mayor, re-elected in 1877, and again in 1879. As a business man he has been unusually successful. He has for many years been a director of the Manufacturers' National Bank. The City Hall of Troy, a structure which compares favorably with any building in the country used for similar purposes, and in convenience of appurtenances and character of workmanship, is a lasting monument of his energy and perseverance while mayor of the city. Was trustee of the Institute, *ex officio*, from 1874 to 1882.

REV. WILLIAM IRVIN, D. D., son of Richard and Mary (Proudfit) Irvin, was born in New York city, October 28th, 1833. Prepared for college at Daniel P. Bacon's select classical school, New York city, and entered the Sophomore class of Rutger's College, July, 1848; was graduated July, 1851; tutor in Latin and Greek, Rutger's College, 1852 to 1854; professor of Latin language and literature, 1854 to 1859; he entered Princeton Theological Seminary in 1859, and graduated April, 1861; he was pastor of the Presbyterian church, Rondout, N. Y., from February, 1862 to May, 1867; and was installed pastor of the

Second Presbyterian church, Troy, N. Y., in May, 1867. Received the honorary degree of D. D. from the College of New Jersey, at Princeton. Elected trustee of Union College, 1876. Has published a few sermons and review articles. Was elected trustee of the Institute in 1876, and still continues in office.

JOHN D. VAN BUREN, JR., C. E., (Newburg, N. Y.) son of John D. and Elvira L. (Aymar) Van Buren, was born in New York city, August 8th, 1838. Prepared for the Institute at the boarding school of Mr. S. R. Calthrop, at Bridgeport, Conn., and at Harvard University in the Lawrence Scientific School. Entered the Rensselaer Polytechnic Institute in the winter of 1858, last term of Division C, and was graduated in 1860. After a supplementary course in mechanics under Prof. B. F. Greene, former Director of the Institute, was appointed assistant engineer in the Croton Aqueduct Department, New York city, in the fall of 1860, and was employed on the Central Park reservoir until the spring of 1861, when he received an apointment to the Engineer Corps (regular) U. S. Navy. Served two years at sea in the Gulf of Mexico, and in the James River Campaign, 1862 ; one year at the Bureau of Steam Engineering, Navy Department, and five years on special duty at the Naval Academy, as assistant Professor of Natural and Elementary Philosophy and Engineering; resigned in the fall of 1868, holding the commission as First Assistant Engineer, and rank of Lieutenant in the Navy. Admitted to the bar of New York, 1868, and practiced a short time, then returned to profession of engineering. Was assistant engineer of the Bureau of Sewers, New York city, 1866 to 1870; assistant engineer under Gens. McClellan and Graham, Dock Department, New York City, 1870 to 1875. Built quay walls and piers in New York city; dams, bridges, walls, etc., on New York State canals; appointed commissioner to investigate New York State canals, with Hon. John Bigelow, Alexander E. Orr, and Daniel Magone, in spring of 1875. Elected State Engineer and Surveyor of New York in the fall of 1875, and filled that office during 1876 and 1877. He is a member of the American Society of Civil Engineers and American Geographical Society. Published several papers in Journal of Franklin Institute; "Improvement of the Water Front

of New York City," and "Quay and other Retaining Walls," in Transactions of American Society of Civil Engineers.

Married, November 24th, 1875, Elizabeth Ludlow Jones, daughter of Samuel T. Jones, of New York city. Was elected a trustee of the Institute in 1876, and resigned in 1882.

CHARLES MACDONALD, C. E., (New York city,) son of William Stone and Isabella (Hall) Macdonald, was born in Gananoque, County Leeds, Canada West, January 25th, 1837. Prepared for Rensselaer Polytechnic Institute at Queens College, Kingston, Canada, and entered the Institute in 1854. In March, 1858, was appointed Assistant Engineer on the Grand Trunk railroad, Michigan; February, 1863, Assistant Engineer Philadelphia & Reading Railroad, Pottstown, Penn.; 1867, Chief Engineer Reading and Columbia railroad, and Perkiomen railroad Baby bridge, Perkiomen; 1868, began business as designer and builder of bridges, and still continues the same; member of the Society of Civil Engineers and of the Institute of Mining Engineers. Married August 5th, 1861, Sarah J. Willard, daughter of William T. Willard, of Troy, N. Y.; three children. Elected trustee of the Institute in 1880, and still continues in office.

JAMES P. WALLACE, C. E., (Brooklyn, N. Y.,) son of Isaac and Fanny (Phillips) Wallace, was born in Lansingburgh, N. Y., April 3d, 1816. Educated at the Lansingburgh Academy and the Rensselaer Polytechnic Institute; graduated in 1837. He intended following his profession as a civil engineer, but not finding ready employment, he accepted a clerkship in a wholesale grocery and produce store; remained one year, and then for one year kept a country store in St. Lawrence county; in 1839 he removed to New York, and entered the produce and commission business; in 1865 he became president of the New York Guaranty and Indemnity Co., and soon after retired from mercantile business. Was president of a convention held in Albany in 1867, with a view to promoting the greater efficiency of the canals of the State; one of the originators of the New York Produce Exchange, and its second president; chairman of the committee that procured from the Legislature the charter of the Exchange; president of the New York Warehousing Co.; one of the founders of the New York Life Insurance company; a

member of the New York Chamber of Commerce; trustee of the Central Trust Co.; trustee of the South Brooklyn Savings Bank; director of the Hanover Insurance company. Married in 1841, Juliet, daughter of Uriah and Julia (Wright) Wallace, of Troy, N. Y.; two children now living. Removed to Brooklyn in 1843, where he still resides; was one of the originators of the Brooklyn Library, and a member of its Board of Trustees; was chairman of the committee to procure a monument to President Lincoln; has traveled much in this country and Europe. Was elected a trustee of the Institute in 1880.

JOSEPH CURTIS PLATT, JR., C. E,, son of Joseph Curtis and Catharine (Scranton) Platt, was born in New Haven, Conn., January 9th, 1845. Attended private and public schools; Phillips Academy, Andover, Mass., and freshman year at Yale College; entered Rensselaer Polytechnic Institute in 1863, and graduated in July, 1866. At Lackawanna Iron Works, Scranton, Penn., until January, 1869; on New Haven, Middletown & Willimantic railroad until April, 1870; at Lackawanna Iron Works, Scranton, Penn. (L. I. & C. Co.) until October, 1870; at Franklin Furnace, N. J., as engineer of Boston Franklinite Co., and later as superintendent of Franklin Iron Co., its successors; in New York city from November, 1874 to April, 1875; April, 1875, to present time, at Waterford, N. Y., president of Mohawk & Hudson Mfg. Co., (Eddy Valve Co.) manufacturers of machinery. Member of American Institute of Mining Engineers. Married, December 8th, 1869, Kate J. Jones, daughter of E. B. Jones, of Penn Yan, N. Y. (now of Auburn, N. Y.) Four children. Was elected trustee of the Institute in 1882.

ELIAS PLUM MANN, C. E., son of Francis N. and Mary J. (Hooker) Mann, was born in Troy, Rensselaer county, N. Y., March 12th, 1852. Prepared at B. F. Harrington's private school, Westchester, N. Y.; entered the Rensselaer Polytechnic Institute in September, 1868, and graduated in 1872. He then spent some time traveling in Europe, and on his return practiced engineering for a short time in 1874. He has since then been connected with the business incidental to that of real estate. He was elected trustee of the Institute in 1882.

HON. EDMUND FITZGERALD has been trustee of the Institute, *ex officio*, since his election as Mayor of the city of Troy, in 1882.

FACULTY AND INSTRUCTORS.

Senior Professors.

*Amos Eaton, A. M.....1824—42
George Hamill Cook, C. E., B. N. S., Ph. D., LL. D.....1842—46
Charles Drowne, C. E., B. N. S., A. M.....1859—60

Directors.

B. Franklin Greene, C. E., A. M.....1847—59
*Rev. Nathan S. S. Beman, D. D., LL. D.....1859—60
Charles Drowne, C. E., B. N. S., A. M.....1860—76
William Lawson Adams, C. E.....1876—78
David Maxson Greene, C. E.....1878

Junior Professors.

*Lewis C. Beck, M. D.....1824—29
*Hezekiah H. Eaton, A. B. (r. s.).....1829—30
*Paul Eugene Stevenson, A. B. (r. s.).....1830—35
*Ebenezer Emmons, A. M., M. D., (N, Y. State Geologist).....1835—39

Professors of Geology.

*Amos Eaton, A. M.....1824—35
*Ebenezer Emmons, A. M., M. D.....1835—39
George H. Cook, C. E., A. M., Ph. D., LL. D.....1842—46
Edward A. H. Allen, C. E.....1851—54
James Hall, A. B. (r. s), A. M., LL. D. (Emeritus 1876).....1854—76
Robert Parr Whitfield, A. M.....1876—78

Professors of Chemistry.

*Amos Eaton, A. M.....1824—35
James Hall, A. M., LL. D.....1835—41
George H. Cook, C. E, Ph. D., LL. D.....1841—46
Edward A. H. Allen, C. E.....1851—55
*William Elderhorst, M. D.....1855—61
Charles A. Goessmann, Ph. D.....1861—64
Henry B. Nason, Ph. D., M. D., LL. D.....1864

Professors of Botany.

*AMOS EATON, A. M.....1824—38
R. HALSTED WARD, A. M., M. D.....1869

Professors of Botany and Zoology.

*JOHN WRIGHT, M. D., (State Botanist of Michigan.).....1838—45
*FREDERICK B. LEONARD, M. D.....1845—48

Professors of Natural History.

*LEWIS C. BECK, M. D.....1824—29
EDWARD A. H. ALLEN, C. E.....1854—55
HENRY B. NASON, A. M., Ph. D., M. D., LL. D.....1858—64

Professors of Mechanics.

B. FRANKLIN GREENE, C. E., A. M.....1847—59
CHARLES DROWNE, C. E., A. M., (Emeritus 1876).....1859—76
WILLIAM HUBERT BURR, C. E.....1876—84
PALMER CHAMBERLAIN RICKETTS, C. E.....1884

Professors of Mathematics and Astronomy.

CHARLES DROWNE, C. E., A. M.....1851—55
DASCOM GREENE, C. E.....1857

Professors of Descriptive Geometry and Drawing.

G. GUSTAVUS BERGER.....1851—53
S. EDWARD WARREN, C. E.....1853—72
DWINEL FRENCH THOMPSON, B. S.....1872

Professors of Geodesy, Road Engineering and Topographical Drawing.

CHARLES DROWNE, C. E., A. M.....1851—55
DAVID MAXSON GREENE, C. E.....1856—61
WILLIAM H. SEARLES, C. E.....1862—64
CHARLES MCMILLAN, C. E.....1865—71
WILLIAM LAWSON ADAMS, C. E.....1872—78
DAVID MAXSON GREENE, C. E.....1878

Professor of Mental Philosophy.

*Rev. NATHAN S. S. BEMAN, D. D., LL. D.....1854—65

Professors of Physics.

EDWARD A. H. ALLEN, C. E.....1851—55
HENRY A. ROWLAND, C. E., Ph. D.....1874—75
ARTHUR W. BOWER, C. E.....1875—80
FRANK PERKINS WHITMAN, A. M.....1880

Professors of Modern Languages.

*George F. Struve.....1854—56
Louis Cousin, B. L. and S., de la Faculte de Paris.....1856—59
Philip H. Baermann.....1861—66
J. H. C. Lajoie de Marceleau, A. B.....1869—73

Professors of English Composition.

James T. Allen, B. S.....1855—58
T. Newton Willson, A. M.....1859—60

Professor of Metallurgy and Practical Mining.

George W. Maynard, A. M.....1867—71

Professor of Analytical Chemistry.

William Pitt Mason, C. E., B. S., M. D., (Ass't Prof. 1882—85).....1885

Assistant Professors of Mathematics.

Charles Drowne, C. E., B. N. S., A. M.....1849—51
Dascom Greene, C. E.....1853—57
*T. Orlando Hopkins, C. E.....1857—59
William Fenton, C. E.....1864—70

Assistant Professors of Physics.

Henry A. Rowland, C. E., Ph. D.....1874—75
Arthur Wellington Bower, C. E.....1875—80

Assistant Professors of Mathematics and Astronomy.

Arthur Wellington Bower, C. E.....1874—75
Palmer Chamberlain Rickets, C. E.....1882—84
Charles Winthrop Crockett, A. M , C. E.....1884

Assistant Professor of Mechanics.

Eleuterio E. Besosa, C. E.....1882—83

Instructors in Mathematics.

Charles Drowne, C. E., A. M.....1847—49
George W. Plympton, C. E., A. M.....1850—51
Dascom Greene, C. E.....1852—53
De Volson Wood, C. E., A. M.....1856—57
Joseph G. Fox, C. E.....1861—62
Horace Loomis, C. E.....1862—63
William Fenton, C. E.....1863—64
George M. Hunt, C. E.....1864—67

Instructors in Descriptive Geometry and Drawing.

DAVID HATHAWAY.....1847—50
S. EDWARD WARREN, C. E.....1852—53
ALBERT H. EMERY, C. E.....1855—58

Instructors in Physics or Mechanics.

ALBERT H. GALLATIN, A. M., M. D.....1866—67
ARTHUR W. BOWER, C. E.....1871—72
HENRY A. ROWLAND, C. E., Ph. D.....1872—74

Instructors in Geodesy.

GEORGE B. ROBERTS, C. E., B. N. S.....1850—51
*JOSEPH A. MOAK, C. E.....1854—55
DAVID MAXSON GREENE, C. E.....1855—56
CHARLES C. MARTIN, C. E.....1856—57
WILLIAM LAWSON ADAMS, C. E., (Acting Professor.).....1864—65
CHARLES E. SMITH, C. E., (Acting Professor.).....1871—72

Instructors in Botany.

*JOSE TELL FERRAO, B. S.....1850—51
LEWIS G. LOWE, C. E., M. D.....1854—55
R. HALSTED WARD, A. M., M. D.....1867—69

Instructors in French or German.

PAUL EDWARD VON THUN.....1852—54
*JOHN B. LUCE, A. M.....1860—61
J. H. C. LAJOIE DE MARCELEAU, A. B.....1866—69
JULES GODEBY, A. B.....1873

Instructors in English Composition.

*JAMES R. PERCY, B. S.....1858—59
CHARLES E. ILLSLEY, A. M., C. E.....1866—67
*ALEXANDER G. JOHNSON, A.M.....1868—75
JOHN HEALY KELLOM, A. M.....1875—77
WILLIAM WEEKS MORRILL, A. M.....1877—82
FRANK LEWIS NASON, A. B.....1882

Assistants in Chemistry and Natural Science.

*EDWARD SUFFERN, C. E.....1835—36
DAN S. SMALLEY, B. N. S., C. E.....1835—36
JONATHAN R. POWELL, C. E., B. N. S.....1847—48
LEWIS G. LOWE, C. E., B. N. S., A. M., M. D.....1849—50
*JOSE TELL FERRAO, B. S.....1850—51

JAMES T. ALLEN, B. S. ..... 1854—55
MATTHIEU DARMSTADT, Ph. D. ..... 1866—68
IRVING A. STEARNS, M. E. ..... 1868—69
EDWARD NICHOLS, B. S. ..... 1871—73
ALFRED S. BERTOLET, M. E. ..... 1873—75
WILLIAM PITT MASON, C. E., B. S., M. D. ..... 1875—82
JOHN FRANCIS WILLIAMS, C. E., B. S. ..... 1883—84

Assistants in Mechanics.

C. WHITMAN BOYNTON, C. E. ..... 1856—57
WILLIAM HUBERT BURR, C. E. ..... 1875—76
WILLIAM HENRY POWLESS, C. E. ..... 1876—78
JOHN ALEXANDER LOW WADDELL, C. E. ..... 1878—80
ADOLFO ELEUTERIO BESOSA, C. E. ..... 1880—82
GUY HARTWELL ELMORE, C. E. ..... 1883—84
WILLIAM WARREN CUMMINGS, C. E. 1884

Assistants in Physics and Mechanics.

JAMES W. BRADSHAW, C. E. ..... 1850—51
WILLIAM TWEEDDALE, C. E. ..... 1852—54
GEORGE L. MOODY ..... 1854—55

Assistants in Mathematics.

GEORGE B. ROBERTS, C. E. ..... 1850—51
DASCOM GREENE, C. E. ..... 1852—53

Assistants in Descriptive Geometry, Geodesy and Drawing.

WILLIAM HENRY POWLESS, C. E. ..... 1875—76
*HERMAN VOORHEES, C. E. ..... 1876—78
ROBERT REMSEN CHADWICK, C. E. ..... 1878—82
GEORGE RICHMOND BAUCUS, C. E. ..... 1882—84
EDGAR BOYD KAY, C. E. ..... 1883—85
JOHN H. EMIGH, C. E. 1883
HARRY LEE VAN ZILE, C. E. ..... 1884—85
CHARLES WELLMAN PARKS, C. E. 1885
ROBERT ANDREW CAIRNS, C. E. 1885

Assistants in Mathematics and Astronomy.

PALMER CHAMBERLAIN RICKETS, C. E. ..... 1875—82
JAMES MAXWELL WILSON, (Special Assistant) 1884

Adjuncts and Assistants to the Senior Professor.

(Appointed for a Single Term or Year.)

*Fay Edgerton, A. B. (r. s.) ..... 1828.
Thomas C. Ripley, A. B. (r. s.) ..... 1828.
Daniel O. Comstock, A. B. (r. s.) ..... 1829.
John M. Barrows, A. B. (r. s.) A. M ..... 1829.
James Curtis Booth, Ph. D., LL. D ..... 1831.
*Samuel W. Williams, A. B. (r. s,) LL. D ..... 1832.
*Alexander Van Rensselaer. A. B. (r. s.) M. D ..... 1833.
David Cady Smith, A. B. (r. s.) ..... 1833.

Adjuncts and Assistants to the Junior Professors.

(Appointed for a Single Term or Year.)

*Timothy Dwight Eaton, A. B. (r. s.) ..... 1827.
*Orlin Oatman, A. B. (r. s.) ..... 1827.
*Douglass Houghton, A. B. (r. s.) M. D ..... 1830.
*James B. Dungan, M. D ..... 1830.
*Abram Sager, A. B. (r. s.) A. M., M. D ..... 1831.
Abel Storrs, A. B. (r. s.) ..... 1832.
James Hall, A. B. (r. s.) A. M., LL. D ..... 1833.

FACULTY AND INSTRUCTORS.

(IN ORDER OF APPOINTMENT.)

SENIOR PROFESSORS AND DIRECTORS.

AMOS EATON, A. M., son of Abel and Azuba (Hurd) Eaton, was a native of Chatham, Columbia county, N. Y., and was born May 17th, 1776. His father was a farmer in comfortable circumstances, a highly respectable citizen, and a deacon of the church. Young Eaton early manifested superior abilities, and his aspirations were for a wide field of action. He was selected to deliver an oration on the 4th of July, 1790, when but fourteen years of age, which was a creditable performance. About this time, having acted as chain-bearer in surveying some land, he resolved on learning the surveyor's art; but how shall he obtain the requisite instruments? He soon interested a skilful blacksmith in his behalf, who agreed to work for him at night, if he would "blow and strike" by day. An accurately constructed needle (magnetized from kitchen tongs) and a good working chain, were the result of several weeks' work. This circumstance in his life doubtless gave rise to the remark, found in *Silliman's Journal*, that "in 1791 he was an apprenticed blacksmith." The bottom of an old pewter plate, well smoothed, polished and graduated, made a pretty good compass case, so that Eaton, when sixteen years old, was in the field with his home-made instruments, doing little jobs of surveying in the neighborhood. But he aspired to higher attainments, a wider sphere of action. Encouraged by his parents, he fitted for college with the late Rev. Dr. David Potter, of Catskill, then of Spencertown, N. Y., and was graduated at Williams College in 1799, with high reputation for his scientific attainments. He commenced the study of law in Spencertown, with Hon. Elisha Williams, September 13, 1799, and subsequently continued his studies in New York with Hon. Josiah Ogden Hoffman. It was at this period, and under the instruction of Dr. David Hosack and Dr. Samuel L. Mitchell, that Mr. Eaton first became espe-

Amos Eaton

UNIV. OF MICH.

cially interested in the study of botany and other natural sciences. While in New York, in 1802, he borrowed Kirwan's Mineralogy, then a scarce book, and made a manuscript copy of the entire work. He was admitted as an attorney of the Supreme Court of the State of New York, at Albany, October 30, 1802, and soon after established himself as a lawyer and land agent in Catskill, N. Y. Here he remained several years, his position affording him good opportunities for cultivating his growing taste for the natural sciences. In May, 1810, he made in Catskill, it is believed, the first attempt in this country at a popular course of lectures on botany (compiling for the use of his class a small elementary treatise,) for which he was highly complimented by his former teacher, Dr. Hosack, as "first in the field," saying "you have adopted the true system of education, and very properly address yourself to the senses and the memory." Here we find Mr. Eaton, at this early day, adopting that mode of instruction which rendered him so pre-eminently successful in inspiring young men with that enthusiasm which assured success.

Owing to a concurrence of circumstances which our limits will not allow us to explain, Mr. Eaton now found his love for the details of his profession diminishing, and his interest in the natural sciences fast growing upon him; and he therefore resolved to abandon the practice of the law, and prepare himself to become an efficient laborer in the congenial pursuits of science. With this end in view, he went to New Haven in 1815, to avail himself of the advantages of Yale College. Here he placed himself under the instruction of Professor Silliman, who threw open to him his lectures on chemistry, geology and mineralogy, as also his own library and the cabinet of minerals of that institution. Here, also, he found a good botanist in Dr. Eli Ives, professor of botany and materia medica in the medical department of the college, who had accumulated a good library, to which he gave Mr. Eaton free access. With these advantages, and Mr. Eaton's already advanced acquirements, he made such rapid progress that he was soon well qualified to take the field as an explorer, and the desk as a teacher. He now turned towards his alma mater, with whose honorable endorsement, as a competent teacher, he desired to go forth into the world; he therefore went to Williamstown in March, 1817,

and was most cordially received by the faculty of the college, especially by Professor Dewey, and gave courses of lectures on botany, mineralogy and geology to volunteer classes of the students. His influence in the college was remarkable. He awakened a lively interest in the natural sciences, which has never died out. With few books adapted to his department, he accomplished wonders. The graduates of that day who were among his pupils, always speak of him in terms of the most affectionate interest and gratitude. They published, in 1817, the first edition of his Manual of Botany, a 12mo, of 164 pages, which gave, as the late Dr. Lewis C. Beck wrote in 1852, "an impulse to the study of botany in New England and New York as the only descriptive work which was then current was that of Pursh, an expensive one, with Latin descriptions." The work, improved by repeated revisions and additions, became, in the eighth edition, published in 1840, a large octavo volume of 625 pages, entitled "North American Botany," and contained a description of 5,267 species of plants. In this edition, Mr. Eaton was assisted by the late Dr. John Wright, professor of botany in the Institute.

Mr. Eaton always aimed to render scientific principles and facts useful; still he loved science, though it brought no pecuniary gain. To him, knowledge was in itself a good, which idea he carried through all the editions of his Manual, from the fifth, by introducing as a motto the following sentence of Linnæus: "That existence is surely contemptible which regards only the gratification of instructive wants, and the preservation of a body made to perish."

The patronage and encouragement which Mr. Eaton received at this time from the faculty and students of Williams College determined him to give courses of popular lectures, accompanied with practical instructions, to such classes as he might be able to organize in several of the larger towns of New England and New York. The aid he thus received he gratefully acknowledged in 1818, by inscribing the second edition of his Botany to the president and professors, saying to them: "The science of botany is indebted to you for its first introduction into the interior of the Northern States; and I am indebted to you for a passport into the scientific world." To Professor Dewey he was warmly attached, and through life regarded him as a successful

fellow-laborer, and his friendship and co-operation were warmly reciprocated. From Williamstown he went first to Northampton, where Governor Strong, the Hon. E. H. Mills, and others, patronized and encouraged him. He gave popular scientific lectures, and practical instructions in many places, with great success. In the course of two or three years he diffused a great amount of knowledge on these interesting subjects; and so far excited the curiosity and enthusiasm of many young students, that there sprung up, as a result of his labors, an army of botanists and geologists.

The following communication from the late Professor Albert Hopkins of Williams College will be read, in this connection, with interest: "Professor Eaton was one of the first to popularize science in the Northern States. For this task he had some special qualifications. He had an easy flow of language, a popular address, and a generous enthusiasm in matters of science, which easily communicated itself to his pupils. I well remember attending a lecture of his in my native town, the first scientific lecture I ever attended, and, if I may judge by the sharp outline of it still in my mind, one of the most interesting and impressive. Perhaps the 'leafy month of June,' the subject of the lecture, 'Flowers,' and the presence of a large number of interesting young persons, may have added something to the charm; but, making all due allowance, I am sure that the lecture itself must have had a good deal of intrinsic merit. Professor Eaton was at this time (1817, I think,) nearly in his prime. His person was quite striking—a large form, somewhat portly and dignified, though entirely free from what is is commonly called *starch.* His face was highly intellectual, the forehead high and somewhat retreating, locality strongly marked, and the organs of observation and compassion well developed. His hair at that time was black, and being combed back, rendered his fine physiognomy still more striking. I well recollect the flowers, which I believe his young pupil, Emmons, had been employed to collect for the occasion. There were, in the first place, the common lilac, which I had probably seen before; however this may be, the small floret, with its salver form corolla and long tubular throat, into which the professor dexterously inserted his penknife, with no murderous intent, but to give us a view of the organs which the great Linnæus had selected as the basis of his

classification,—this small floret, I say, is the first I now recollect to have seen; and seen it was, and still is, with great distinctness. Then followed the Pedicularis and some plants more difficult in their analysis. In the analysis of these plants Professor Eaton made use of his manual, descriptive of plants in the vicinity of Williams College, a book which, with some imperfections, was highly valuable as a pioneer work. Professor Eaton was among the first in this country to study nature, in the field, with his classes. In pursuance of this idea he used to make an annual excursion with Rensselaer School, sometimes leading these expeditions in person, at others deputing some competent teacher to take the lead. The cause of natural history in Williams College owes, undoubtedly, a good deal to Professor Eaton. I think his zeal in the department of Botany led Professor Dewey to direct his discriminating mind to the study of plants. a study which he pursued farther than Professor Eaton had done, in certain lines, particularly in caricography, which was then a kind of *terra incognito*, and still is, except to the initiated. At this time, also, as has been hinted, Dr. Emmons took the field. In fact, natural history came in on a spring tide, and has never lost the impulse since."

In 1818, in compliance with a special invitation from Gov. De Witt Clinton, he went to Albany, and there gave a course of lectures before the members of the Legislature. Here he became acquainted with many of the leading men of the State, interesting them especially in geology, and its application, by means of surveys, to agriculture. There and then were set in operation a train of causes which resulted in giving to the world that great work, "The Natural History of New York," so creditable to the State and to those scientific gentlemen who executed it, several of whom had been Professor Eaton's pupils. In this year he published the first edition of his "Index to the Geology of the Northern States," which "was the first attempt at a general arrangement of the geological strata in North America." Although this and his subsequent works on Geology have been found to contain some errors, still it is universally conceded that great credit is due him for his early and successful labors in developing the Geology of America.

"In the spring of 1819, while I was a member of Lenox Academy, Mr. Eaton came there, at the request of Hon. H. W.

Bishop, and delivered a short course of lectures on Botany. And I retain a vivid recollection of his manly appearance, his constantly flowing conversation, and his instructive lectures. He afterward delivered several courses of lectures in the Medical College at Castleton, Vt., in which he was appointed Professor of Natural History in 1820. Professor Eaton's lectures and practical instructions in Troy produced a most happy impression, where, through his efforts, seconded by many of the most distinguished gentlemen of that city, such as Drs. Burrit, Robbins and Hale, there was established a Lyceum of Natural History, which for many years did much service to the cause of natural science. In the fall of 1818 Troy could boast of a more extensive collection of American geological specimens than could be found at any literary institution in this country. In 1820 and 1821 Mr. Eaton, with the assistance of Drs. T. Romeyn and Lewis C. Beck, made, at the expense and under the patronage of the Hon. Stephen Van Rensselaer of Albany, N. Y., geological and agricultural surveys of Albany and Rensselaer counties, reports of which were published. This, it is believed, was the beginning of such surveys in this country, of which Professor Silliman, in his journal, remarked: 'The attempt is novel in this country;' adding, 'We are not aware of any attempt on so extensive and systematic a scale, to make them [such surveys] subservient to the important interests of agriculture.' The Hon. Stephen Van Rensselaer, for many years one of the trustees of Williams College, and the generous patron of merit, employed Prof. Eaton to make a geological survey of the district adjoining the Erie canal, and the result was published, in 1824, in a report of 160 octavo pages, addressed to his patron, with a profile section of rock formations, from the Atlantic ocean, across the States of Massachusetts and New York, to Lake Erie. Of the work of Professor Eaton, Gov. Seward, in his introduction to 'The Natural History of the State of New York,' said: 'This publication marked an era in the progress of geology in this country. It is, in some respects inaccurate, but it must be remembered that its talented and indefatigable author was without a guide in exploring the older formations, and that he described rocks which no geologist had, at that time, attempted to classify. Rocks were then classified chiefly by their mineralogical characters, and the aid which the science has since

learned to derive from fossils in determining the chronology and classification of rocks was scarcely known here, and had only just begun to be appreciated in Europe. We are indebted, nevertheless, to Professor Eaton for the commencement of that independence of European classification, which has been found indispensible in describing the New York system.' 'For,' he adds, 'after examining our rocks with as much care and accuracy as I am capable of doing, I venture to say that we have at least five distinct and continuous strata, neither of which can with propriety take any name hitherto given and defined in any European treatise which has reached this country. Professor Eaton enumerated nearly all the rocks in western New York, in their order of succession, and his enumeration has, with one or two exceptions, proved correct. It is a matter of surprise that he recognized, at so early a period, the old red sandstone on the Catskill Mountains, a discovery the reality of which has since been proved by fossil tests."

In 1824 the Hon. Stephen Van Rensselaer established, at Troy, N. Y., a school of science, called the Rensselaer School, placing Mr. Eaton at its head as "Senior Professor." Here he continued his labors through the remainder of his life, publishing, at different times, several scientific works required for his own pupils, as well as for the general advancement of science. In this school Professor Eaton was enabled to perfect and carry out, to a high degree of success, his favorite plan of teaching classes by making his pupils experimenters and workers, in every department of science where it was practicable ; substituting also lectures by the pupils to each other, in place of the usual system of recitations. This method of giving instruction, and of preparing young men to become successful teachers, has here succeeded most admirably, and has been, in some of its features, introduced into other schools of science. The Rensselaer School still exists, with only a slight change of name ; its course of study, though modified and extended, still retains the characteristic features impressed upon it by its first Senior Professor. As a school of practical science, it occupies the very highest place, and its graduates are to be found in every State of the Union.

It will thus be perceived that in developing the botany and geology of the Northern States, Professor Eaton rightfully

ranks among the pioneers of the new era of the natural sciences in this country. His efforts in various departments of natural history were a rich gift to New England, New York, and even to the whole country, for which the country owes him a debt of gratitude. Many of his pupils have been for years among the most justly distinguished scientific men of the country. As an educator and an active laborer in the general cause of natural history in America, his memory will long be cherished. The history of natural science on this continent can never be faithfully written without giving the name of Amos Eaton an honorable place. It was he, more than any other individual in the United States, who, finding the natural sciences in the hands of the learned few, by means of popular lectures, simplified textbooks and practical instructions, threw them broadcast to the many. He aimed at a general diffusion of the natural sciences, and nobly and successfully did he accomplish his mission.

Professor Eaton was a kind-hearted and courteous gentleman. His vast acquirements and simple habits induced a distinguished woman, Mrs. Emma Willard, the founder of the Troy Female Seminary, who knew him well, to speak of him as "Amos Eaton, the Republican Philosopher." He died in Troy, N. Y., May 6, 1842, in the sixty-sixth year of his age, saying, "I submit to my Heavenly Father's will. His remains are interred in Oakwood cemetery, at Troy, N. Y., where, with appropriate ceremonies, a suitable monument was placed by the alumni, at the time of the semi-centennial celebration, 1874. The monument is a cubical block of light gray granite, measuring four feet six inches by five feet, and bears the simple inscription: "Prof. Amos Eaton, born May 17th, 1776, died May 10th, 1842." The stone was brought from Clark's Island, on the coast of Maine, and weighs eleven tons.

Three of Professor Eaton's sons, who were educated by their father to follow him in the walks of science, died young. Hezekiah Hulbert Eaton, Assistant Professor of Chemistry in Transylvania University, a scholar of great promise, died at the age of twenty-three. Major General Amos B. Eaton was graduated at West Point In 1826; was an officer in the United States army and a man of scientific tastes. He died at New Haven, Conn., Feb. 21, 1877. A daughter of Professor Eaton, Miss Sara C. Eaton, was a distinguished teacher of the natural

sciences and the modern languages in the flourishing Female Seminary at Monticello, Ill. Professor Daniel Cady Eaton, son of General Eaton, was graduated at Yale College, in 1857, and has been Professor of Botany in that institution since 1864.

Professor Eaton published an Elementary Treatise on Botany, 1810; Manual of Botany, 1817; Botanical Dictionary, 1817; Botanical Exercises, 1820; Botanical Grammar and Dictionary, 1828; Chemical Note Book, 1821; Chemical Instructor, 1822; Zoölogical Syllabus and Note-Book, 1822; Cuviers' Grand Division, 1822; Art without Science, 1800; Philosophical Instructor, 1824; Directions for Surveying and Engineering, 1838; Index to the Geology of the Northern States, 1818; Geological and Agricultural Survey of the County of Albany, N. Y., 1820; Geological Nomenclature of North America, 1822; Geological and Agricultural Survey of the District adjoining the Erie Canal, 1824; Geological Text-Books, prepared for popular lectures on North American Geology, 1830; Geological Text-Book, for Troy Class, 1841. Of most of these works, a number of different editions were printed, amounting in all to about forty publications. (*Durfee's History of Williams College.*)

George Hamill Cook, C. E., Ph. D., LL. D. son of John and Sally (Munn) Cook, was born in Hanover, N. J., January 5th, 1818. He was prepared for the Institute in the public schools and with private teachers. Was engaged as civil engineer on Morris & Essex railroad, New Jersey, and Catskill & Canajoharie railroad from April, 1836, to December, 1838. He entered the Institute December, 1838, and taught district school in Chatham, N. J., parts of 1839 and 1840. Was student and tutor in the Rensselaer Polytechnic Institute May, 1840; adjunct professor October, 1840; senior professor May, 1842. He was a manufacturer of glass in Albany October, 1846; professor of mathematics in the Albany Academy, July, 1848; principal of Albany Academy, July 15, 1851; and professor in Rutger's College, New Brunswick, N. J., from November, 1853, to the present time. He was assistant in the geological survey of New Jersey in 1854–6; state geologist of New Jersey from 1864; director of the New Jersey agricultural experiment station, 1880; in the board of water commissioners of New Brunswick from 1873, and president of the board from 1882. He received the honorary

degree of LL. D. from Union College, and Ph. D. from the University of New York city. He was elected a member of the American Association for the Advancement of Science in 1842, and was a member of the American Philosophical Society, the Royal Agricultural Society of Sweden, the Academy of Natural Sciences, Philadelphia, and the American Institute of Mining Engineers. He published "Geology of New Jersey," 1868; "Geological Reports on Fire-clays," 1878; "Annual Reports on Geological Survey, 1854–6, and 1864–84;" "Annual Reports of the New Jersey Agricultural Experimental Station, 1881–84."

Prof. Cook was married March 26th, 1846, to Mary H. Thomas, daughter of William Thomas. Five children.

BENJAMIN FRANKLIN GREENE, A. M., C. E., was born in Lebanon, N. H., October 25th, 1817. He entered the Rensselaer Polytechnic Institute November 5th, 1841, and graduated in 1842. Was professor of mathematics and natural philosophy, Washington College, Maryland, November, 1843, to December, 1846; director of Rensselaer Polytechnic Institute and professor of mechanics, machines and constructions, January, 1847, to July 1859; private school of engineers, at Glenmore, Troy, N. Y., October, 1859, to July, 1862; chief clerk of Bureau of Navigation, February, 1863, to March, 1873. Was professor of mathematics in United States Navy (commissioned March 28th, 1873), and detailed as superintendent of companies same date. He was editor of "Magnetism of Ships and Direction of the Compass," two volumes, 1867; "Projectile Tables," one volume, 1868; "International Signal Code," one volume, 1873. He was also author of a report on the reorganization of the Rensselaer Polytechnic Institute, 1855; several books of computation forms in nautical astronomy, chronosemic signals, 1863, and a paper on the marine compass, 1874, read before the United States Naval Institution.

Hs was married April 11th, 1848, in Maryland; his wife died June 10th, 1850; four children, none living.

NATHAN SIDNEY SMITH BEMAN, D. D., LL. D., was director of the Institute from 1859 to 1860. *See Presidents, page 30.*

CHARLES DROWNE, A. M., C. E., was born July 5th, 1824. He entered the Institute and was graduated in 1847. The same

year he was appointed repeater of mathematics and physics; in 1849, adjunct professor of theoretical and practical mathematics; in 1851, received the appointment of professor of mathematics, astronomy and geodesy, which position he held until 1855. In 1859, he was appointed Senior Professor, and professor of civil engineering, and in 1860 was made Director and professor of thereotical and practical mechanics. In 1875, on account of impaired health, he resigned his position, and was made Emeritus professor by the unanimous vote of the trustees, his name still appearing in the Annual Register.

During Professor Drowne's long period of service, of sixteen years, there were many and important changes in the institution. The old buildings were destroyed by fire, and the present ones were erected. The courses of study were broadened, and the examinations made more careful and rigid. By his own example of fidelity, painstaking and devotion, a manly and earnest spirit of study was infused, and the high standard of scholarship was maintained. During this period, over two hundred names were added to the list of graduates.

After leaving the Institute, two or more years were spent in foreign travel and study; making his headquarters at Hanover, Germany. His health during this time was greatly improved, and he returned to his home in Canaan, N. Y., where he still resides. Was married, July 18th, 1872, to Frances Emily Bortells, of Palmyra, N. Y.

WILLIAM LAWSON ADAMS, JR., C. E., son of William Lawson and Araminta D. (Platt) Adams, was born at Morrisville, Madison county, N. Y., July 13th, 1842. He prepared at the Troy Academy, and entered the Rensselaer Polytechnic Institute in September, 1859, graduating in 1863. From June 15th to October 1st, 1863, he was assistant engineer on the Brooklyn Water Works; and from October 1st, 1863, to May 1st, 1864, engaged in the United States civil service in charge of government surveys in the Sea Islands. September, 1864, to February, 1865, he was acting professor of geodesy, road engineering and topographical drawing in the Rensselaer Polytechnic Institute. From July, 1866, to August, 1869, was assistant engineer on a railroad in Iowa; August, 1869, to August, 1872, engineer of the land department, Union Pacific railroad; August, 1875, to

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September, 1872, principal assistant engineer Texas Pacific railroad. From September, 1872, to February, 1876, was professor of geodesy, road engineering and topographical drawing, and from February, 1876, to September, 1878, Director of the Rensselaer Polytechnic Institute, and professor of road engineering and topographical drawing. From September, 1878, to June, 1880, was assistant engineer on the Union Pacific railroad, and from June, 1880, to January, 1883, principal assistant engineer on the Missouri Pacific railroad, Omaha extension. Since January, 1883, has been a civil engineer and architect at Omaha, Neb., and chief engineer of the Omaha Belt Line and Lincoln branch of the Missouri Pacific railroad, uow being constructed. Married, September 7th, 1875, Clara E. Kellom, daughter of John H. Kellom, of Omaha, Neb.; three children.

DAVID MAXSON GREENE, C. E., son of Joseph Langford and Susannah (Maxson) Greene, was born July 8th, 1832, in Brunswick, Rensselaer county, N. Y. His family is descended from John Greene, who emigrated from England in 1635, and settled in Rhode Island, where he was associated with Roger Williams. His mother descended from Rev. John Maxson, the first white child born on Rhode Island, R. I. At the age of three years he was taken to Adams, N. Y., where his family continued to reside, and where he was brought up on a farm. His schooling was in the district school until he was fifteen years of age, when he attended the Adams Seminary. In October, 1850, at eighteen years of age, he entered the Rensselaer Polytechnic Institute, and was admitted to the graduating class, consisting of twenty-four members ; he was one of the four, out of this number, who passed the examinations and were graduated, August 29th, 1851, as civil engineers.

Immediately upon graduation, he was appointed assistant to the professor of mechanics and physics in the Institute, remaining until the spring of 1852, when having been appointed assistant engineer on the enlargement of the Erie canal, he relinquished his position. He rose through the grades of chainman, rod-man, assistant leveler, and leveler. In September, 1853, he went west, and was employed as assistant and division engineer on railroads in Ohio and Indiana. After a year's service, he was prostrated with sickness and returned east. In

September, 1855, he was appointed professor of geodosy and topographical drawing in the Institute. In order to prepare himself for his work, he spent part of his first year at West Point, as a pupil of the late General Thomas H. Neill, United States Army, taking a course in topographical drawing. His success in his department was immediate and rapid, the work of his classes being quite equal to that at West Point. He held this professorship until the spring of 1861, when he was appointed third assistant engineer in the United States Navy. He was, at the same time, offered a position as chief topographical engineer for the Government of Peru, for five years, at a large salary, which he declined.

He was ordered to the frigate Susquehanna, upon which he served sixteen months, participating in the engagements at Hatteras, Port Royal, Fortress Monroe, and the capture of Norfolk, and doing blockade duty along the coast from Hatteras to Mobile. In September, 1862, he was detached, and ordered to the United States Naval Academy, as senior assistant in the department of natural and experimental philosophy, and as instructor in steam engineering. After remaining three years in this position, he was detached and ordered to duty as assistant to the chief of the bureau of steam engineering in the Navy Department at Washington, where he remained for three years, during which time he was detailed as a member of a commission appointed by the U. S. Treasury Department to devise means to secure the collection of the revenue on distilled spirits. Subsequently he was ordered to the United States steamer Narragansett, as chief engineer, in the West India squadron. Yellow fever broke out on board, and Engineer Greene was attacked. The vessel was ordered north and went out of commission. Next Engineer Greene was detailed as chief engineer of the Port Admiral's vessel in New York harbor, but in 1869 he resigned from the navy, having served about eight and a half years.

After resigning, he settled in Troy, and began the practice of his profession as civil, mechanical and hydraulic engineer, and as consulting engineer and expert. In 1872 he was appointed chief engineer of the proposed Walloomsac railroad ; also consulting engineer of the Ottawa City Water Works, Canada.

In 1873 he was appointed chief engineer of the Dansville Water Works, Livingston county, N. Y., and in 1874 Village Surveyor of West Troy, N. Y. He served as engineer to the State Commission appointed to examine plans for introducing steam on the canals, from 1871 to 1874. In 1874 he was appointed division engineer on the New York state canals. In July of the same year he was appointed Deputy State Engineer, and served until January 1, 1878. From 1872 to January 7th, 1885, he was engineer of the Troy City Water Board. He is also a general consulting engineer.

In September, 1878, he accepted the appointment of Director of the Rensselaer Polytechnic Institute, which position he still holds. He is a director of the Troy City National Bank, and also of the Troy Citizens' Steamboat Co.

He married Maria N. Skinner, second daughter of the late Hon. Calvin Skinner, of Adams, N. Y., January 31st, 1855.

JUNIOR PROFESSORS.

LEWIS C. BECK, A. M., M. D., was born at Schenectady, N. Y., October 4th, 1798; died at Albany, N. Y., April 21, 1853. Was a brother of John B. and Theodoric Romeyn Beck. He graduated at Union College in 1817. Was admitted to the practice of medicine at Schenectady in 1818; he resided in St. Louis in 1820–21, and afterwards settled in Albany. He was appointed Junior Professor of the Rensselaer School before it opened, November 5th, 1824, to give full courses of demonstrative lectures on chemistry, botany, mineralogy and zoology, and resigned September 1st, 1828. He was professor of botany and chemistry in the Vermont Academy of Medicine, 1826–32; gave a course of chemical lectures at Middlebury College in April, 1827; was mineralogist of the survey of New York in 1837. In 1830, he was professor of chemistry and natural history in Rutger's College, N. J., and at the time of his death was professor of chemistry in the Albany Medical College. He published "Account of the Salt Springs at Salina," 1826; "On Adulterations," 12mo, New York, 1846; "Botany of the United States," and of the "United States North of Virginia," 12mo, 1848; "Mineralogy of New York," quarto, 1842; "Illinois and

Missouri Gazetteer," octavo, 1823; "Chemistry," 1831. For a complete list of Dr. Beck's writings, see Memoir by Dr. Alden March, in "Gross's Medical Biography."

HEZEKIAH HULBERT EATON, A. B. (r. s.), son of Amos and Sally (Cady) Eaton, was born at Catskill, Greene county, N. Y., July 21st, 1809. He was educated by his father, Professor Amos Eaton, having been his assistant at lectures and in work at Middlebury, Vt., and elsewhere, and entered the Rensselaer Polytechnic Institute at its opening. He gave lectures on chemistry at Black Rock and Rochester, N. Y., in the summer of 1825, and at the Female Academy in Canandaigua in the winter of 1826–27. In the winter of 1828 he lectured on chemistry before the Mechanics' Institute in Boston. In 1829 he was elected to a Junior Professorship in the Rensselaer Polytechnic Institute. In the autumn of 1829 he removed to Lexington, Ky., and in 1831 was chosen assistant professor of chemistry in the medical department of Transylvania University, and lectured on chemistry and electricity. This position he held until his death. He, with Dr. Wm. Akin, "selected, arranged, compared and transcribed" the greater part of the fifth edition of his father's Manual of Botany (1828–1829). At the time of his death he was preparing a work on "The Birds of Kentucky." He was a member of the Philadelphia Academy of Natural Sciences; was the author of "Notices of Western Botany and Conchology," published in the fourth volume of the "Transylvania Journal of Medicine."

Married, December 1st, 1831, Mary R. Harper, of Lexington, Ky. He died of consumption, August 16th, 1832.

REV. PAUL EUGENE STEVENSON, A. B., (r. s.) A. M., son of James Stevenson, was born in New Brunswick, N. J., October 14, 1809. Having passed through the usual academical studies preparatory to a collegiate course, under the tuition of his father (who was celebrated in his day as an instructor of youth) he entered the Institute, from which he was graduated in 1839. He was then appointed junior professor, and delivered several courses of lectures. From here he went to Union College, in April, 1832, and entered the junior class. During his senior year he delivered a course of chemical lectures in Albany, in the new Medical College; but he returned again to Schenecta-

dy and graduated with his class in 1833. In December of that year he entered the Theological Seminary at Princeton, N. J. His course here was interrupted by ill-health, which compelled him to suspend his studies for one whole year; he graduated from the Theological Seminary in 1837, and was licensed to preach by the Presbytery of New York. Soon afterwards, through the influence of Dr. Archibald Alexander, he was called to the pastorship of the church at Staunton, Va. He was ordained to the gospel ministry and installed pastor by the Presbytery of Lexington, Va., June 9, 1838, where he remained for seven years.

In 1844 he accepted a call to the South Third Street church, Williamsburgh, N. Y., remaining here five years. In 1849 he accepted a call to the church at Wyoming, Pa. While laboring here as a pastor, he took charge of an academy, to which he afterwards devoted his whole time, having given up his pastorate. Under his direction the institution came to a state of high prosperity and usefulness. From this period of his life, he devoted himself to the work of a teacher, being fully convinced that he was especially fitted for this department of christian labor. He was always accustomed to call his school his parish. After spending six years in Wyoming, the health of his family compelled a removal. He went first to Bridgeton, N. J., where he remained only one year, and then removed to Madison, N. J., connecting himself, April, 1857, with the Passaic Presbytery. In 1866 he was induced to go to Paterson, N. J., where he founded the Passaic Falls Classical Institute, a school for young ladies that reflected great credit upon its teachers, and was regarded with unqualified favor by its patrons. Beside his labors in the school, he often preached, and devoted much time to the work of the church.

His physical strength was overtaxed by his fatiguing and varied labors, which caused nervous prostration, from which he never recovered. He languished a few weeks without much pain, but constantly grew weaker until he died, March 17, 1870. His last words were characteristic of his devoted and earnest piety: "I long to be with Jesus; glory be to God, the Father, the Son and the Holy Spirit." It was remarked by many that he possessed all the qualities of a perfect gentleman, as well as of a most earnest, devoted and consistent christian.

EBENEZER EMMONS, A. M., M. D., was born at Middlefield, Mass., May 17, 1796. He fitted for college under the Rev. Mr. Hallock, of Plainfield, N. J., entered college in 1814, and was graduated in 1818. During his college course he became greatly interested in the study of the natural sciences, under the tuition of Amos Eaton and Prof. Dewey, and subsequently had a large share in introducing those studies into the country. After graduation he studied medicine, and settled as a physician in Chester, Mass. He still continued his favorite studies. He graduated at Rensselaer School with the class of 1826. The same year he published his "Manual of Mineralogy and Geology," for the use of the students of the school. Soon after he removed to Williamstown, where he was appointed lecturer on chemistry in Williams College, and gave attention to the formation of a cabinet of mineralogical and geological specimens. He also continued the practice of medicine. He was appointed junior professor in the Rensselaer School in 1830, and held this position until 1840. In 1836 a geological survey of the State of New York was undertaken, and Dr. Emmons was appointed by Gov. Marcy one of the four surveyors. The second, or northern district, was assigned to him, much of which was unexplored territory. He made the public acquainted with the Adirondack region, and gave the names to the principal mountains. While engaged in these labors, Dr. Emmons discovered, as he supposed, a group of rocks intervening between the Potsdam sandstone—the lowest of the sedimentary formations of New York—and the primitive rocks of central Vermont, and constituting a distinct system, underlying the silurian, and not recognized in the ordinary classification. He proposed to call it the Taconic system. His views, however, met with general opposition, and, when persisted in, even with ridicule, still, such was the firm conviction of their truth, based upon personal observation, as to lead him, single-handed, to maintain a warfare in their behalf, though it subjected him to much odium, and to a species of ostracism, at the hands of his professional brethren. Subsequent discoveries in the Canada survey, and by Barrandi, in Bohemia, and the latest investigations by eminent geologists, did very much to sustain his position.

In 1838 Dr. Emmons was appointed to the professorship of chemistry in the Albany Medical College, and took up his resi-

dence there. He still retained his connection with Williams college, going there annually to deliver a course of lectures upon geology and mineralogy. His "Report on the Second Geological District of New York" was published in 1842. In 1843 he was directed by Gov. Bouck to take charge of the agricultural part of the survey, which heretofore had had no distinct organization.

In 1846 the first volume of the "Agriculture of New York" was published, containing an account of the classification, composition, and distribution of the soils and rocks, and of the natural waters of the different geological formations, etc. The second volume, devoted mainly to the analysis of grains, and other vegetable products, with many illustrations, was published in 1849. The third volume, devoted to the cultivated fruits of the State, was published in 1851. This part consists of a volume of text, with a volume of more than ninety colored plates, illustrating fruits. In 1854 the fourth volume, under the title of the "Agriculture of the State," was published, containing descriptions and figures of insects injurious to vegetation, and is illustrated by about fifty colored plates.

Previous to the publication of the last volume, Dr. Emmons had been appointed by the governor of North Carolina to the charge of the geological survey of that State. His Report upon the Geology of the Midland Counties of North Carolina" appearad in 1856. The report on the "Agriculture of the Eastern Counties" was published in 1858, and a report on "The Swamp Lands of North Carolina" in 1860.

In 1860, also, he published a brief text-book of geology. It was preceded, in 1854, by the first part of a treatise upon American geology. The breaking out of the war interrupted his labors, and the anxieties consequent upon it, and upon his separation from his friends, probably hastened his death, which took place at Brunswick, N. C., October, 1863.

Dr. Emmons was a plain, unpretending man, of solid attainments and worth. His perception was quick and his knowledge accurate. He was an indefatigable worker. He sustained a Christian character, and held the office of deacon in the Congregational church at Williamstown.

PROFESSORS.

JOHN WRIGHT, M. D., son of John and Hannah (Dawson) Wright, was born in Troy, N. Y., February 2d, 1811. He prepared for the Institute at Allen Fisk's school in Troy, and entered in 1828. He practiced medicine in Troy, and was a professor of natural history in the Institute from 1838 to 1845. He was appointed to the State survey in Michigan in 1837, and remained there about two years. He was admitted to the practice of medicine in New York city. Was associated with Professor Eaton in publishing the "North American Botany," and issued a "Flora of the Plants within ten miles of Troy." The dates of these publications are unknown. He married Mary Cottrell, April 11th, 1838, who died April 10th, 1841; had one son, who died September 18, 1841; was again married to Catherine Wyant, December 5, 1844. He died of consumption in Aiken, S. C., April 11th, 1846. In 1874, a handsome memorial window was placed in the east end of Institute Hall, by Mrs. James Gardner, of Lansingburgh, N. Y., in memory of her brother, Dr. John Wright.

GEORGE HAMILL COOK, A. M., Ph. D., LL. D., was appointed professor of geology and civil engineering, 1842. *See page 129.*

FREDERICK BALDWIN LEONARD, M. D., of Lansingburgh, N. Y., was appointed professor of botany and zoology in 1846, and resigned in 1848. *See Trustees, page 99.*

CHARLES DROWNE, A. M., C. E., was appointed professor of mathematics, astronomy and geodesy in 1851, and resigned in 1855. *See Directors, page 130.*

EDWARD AUGUSTUS HOLYOKE ALLEN, C. E., son of Joseph and Lucy C. (Ware) Allen, was born in Northborough, Worcester county, Mass., August 15th, 1828. He attended the State Normal School, Bridgewater, Mass. Entered the Institute in 1847, and graduated in 1850. He spent one year in the Lawrence Scientific School, Cambridge, Mass. Then accepted, in 1851, the appointment as professor of geology, etc., at the Institute. He resigned in the spring of 1855, and became principal of the Friends' Academy, New Bedford, 1855 to 1869. He then had a private school in New Bedford until 1872. Taught in English

and Classical School in West Newton two years, until 1874. Was principal of Sawin Academy, Sherborn, Mass., until 1882, and of Allen Howe School, Northborough, Mass., since that time. Was teacher of country schools in Northfield, Mass,, 1844–45 ; Dana, 1845–46 ; North Bridgewater, 1846–47 ; German school, Baltimore, Md., 1847–48. Was on school committee in Sherborn, Mass., also in Northborough, Mass. He is a member of the Natural History Society of Montreal. Published " Reformed Spelling " and " Oral Teaching." Married September 5th, 1855, Eugenia S. Tenlon, daughter of Dr. William F. Tenlon ; eight children.

G. GUSTAVUS BERGER occupied the position of professor of descriptive geometry, structural and topographical drawing from 1850 to 1851.

SAMUEL EDWARD WARREN, C. E., only child of Dr. Samuel and Anna Catherine (Reed) Warren, was born in the village of West Newton, in the town of Newton, Mass., October 29, 1831. His father was born in Weston, Mass., and his mother in Charlestown, Mass. He remained at home till September, 1846, attending a private school from about his fifth year. In 1844 he entered the " Model," that is, the experimental part of the State Normal School, at West Newton, where, under superior instruction, a decided taste was formed for mathematics, etc. In September, 1846, he entered Phillips Academy, Andover, Mass., the English department then being in charge of William H. Wells, and in April, 1848, entered the Putnam free school, Newburyport, Mass., where he remained for two years. In May, 1850, he entered the Rensselaer Polytechnic Institute, and graduated in September, 1851, the Commencement of that year being held in Apollo Hall, Congress street, then the principal hall in the city. In November, 1851, he returned to the Institute, as a resident graduate and " repeater," or assistant, in charge of descriptive geometry, geodesy, mechanics and drawing. In September, 1854, he was appointed professor of graphics, the department embracing descriptive geometry and geometrical drawing. This position was held by Professor Warren until 1872, when he was appointed professor in the Massachusetts Institute of Technology, Boston, Mass. During the period of his professorship at Troy, he prepared a number of text-books, which

appeared in the following order: 1860, "Descriptive Geometry;" 1861, "Projections," first entitled "Students', Draftsmen's and Artisans' Manual," which was revised in 1867 and also in 1872; 1863, "Elementary Perspective; 1865, "Drafting Instruments and Operations;" 1867, "Elementary Plane Problems;" 1867, "Shades and Shadows;" 1868, "Higher Perspective;" 1870, "Machine Construction and Drawing." Called to the Massachusetts Institute of Technology, at Boston, in 1872, he remained there three years, living in a suburban residence, which, by change of municipal boundaries, was first in Brighton, then in Boston, and finally, and ever since, in Newton. After those years of diligent service, embarrassed, however, by great contrasts between the new and former conditions under which his duties were performed, the great reduction of attendance following the panic of 1873, led to the successive vacating of his and of other professors' chairs. Leaving his work in Boston in a very promising condition in 1875, he has been engaged in completing and perfecting his series of text-books: "Free-Hand Drawing," 1873, (revised and enlarged in 1878); "Stone Cutting," 1875; "Elements of Descriptive Geometry, Shadows and Perspective," 1877; "Drafting Instruments," (revised and enlarged,) 1879; and "Projective Drawing," (revised and entarged,) 1881.* He has, besides, given private instruction to a considerable number of pupils of various ages, in numerous subjects; together with parlor lectures on history and art. He has also been an occasional contributor to educational and other periodicals.

Professor Warren has been a member of the Newton Natural History Society since its formation in 1878, has read several papers at its meetings, and has been successively its vice-president, treasurer and secretary. He is also a member of the New England Historic-Genealogical Society, from whose library he learns that he is the eighth in descent from John Warren of Watertown, Mass., an original and large land-owner in 1630, and who, as an illustration of his time, had his house searched for Quakers, and was sometimes fined for absence from church. Prof. Warren was married on November 18th, 1884, to Miss Margaret Miller, daughter of Mr. James Miller, of Paisley, Scotland.

*His individual exhibit of his works at the Paris Exposition of 1878, accompanied by a large album of plates by former pupils in Troy and Boston, gained a diploma of "honorable mention," in a department (Education) in which it is believed only larger school or municipal exhibits gained larger notice.

REV. N. S. S. BEMAN, D. D., LL. D., was appointed professor of mental and moral philosophy in 1854, which position he held, being also president of the Institute, until 1865. *See Presidents. page 30.*

JAMES HALL, B. N. S., A. M., LL. D., was born of English parents at Hingham, Mass., September 12th, 1811. Intended at first for the medical profession, he soon turned his attention to natural history, and from 1831 to 1836 he pursued his studies under Professor Amos Eaton, in the Rensselaer School, now the Rensselaer Polytechnic Institute, where for many years he has been professor of geology.*

On the organization of the Geological Survey of the State of New York, in 1836, he was appointed assistant geologist in the Second district, as the survey was then divided ; and in 1837 he was appointed State Geologist for the Fourth geological district. He published annual reports, from 1838 to 1841, and in 1843 made his final report, a large quarto volume, forming one of the series of works on the natural history of New York, published by the State. In this volume is described, in a very complete manner, the order and succession of the strata, their mineralogical and lithological character, and their organic remains.

In 1843, on the resignation of Mr. Conrad, Mr. Hall was appointed to take charge of the palæontological department of the survey, and in this work he has been engaged down to the present time, 1886. He has embodied the results of his investigations in the "Palæontology of New York," one of the most remarkable monuments of scientific labor, zeal and industry which this country has produced, and alike creditable to the learning of the author and the liberality of the State. The volumes have been published as follows :

The first volume, beginning with the lowest member of the New York system of palæozoic rocks, contains descriptions of all the organic remains up to the summit of the so-called Champlain division, which terminates with the Hudson river group, corresponding to the Cambrian of Sedgwick, or the

* This sketch is founded mainly upon the biographical notice by Dr. T. Sterry Hunt, published in Appleton's Cyclopædia in 1874, with later data from the "Civil Service of the State of New York," and other sources.

Cambrian and Lower Silurian of Murchison. (388 pages quarto, with 100 plates, 1847.)

The second volume continues the series up to the base of the Onondaga or Salina formation. (362 pages, with 124 plates, 1852.)

The third volume includes all the fossil remains of the water-lime, the Lower Helderberg and Oriskany sandstone, except the corals and bryozoans. (522 pp. with 141 plates, including 21 intercalated plates, 1859.)

The fourth volume includes the Brachiopoda of the Upper Helderberg, Hamilton, Portage, and Chemung groups, making together the Erian or Devonian system. (Pp. xi, 428, and 69 plates, including 6 intercalated plates, 1867.)

The fifth volume, as originally planned, was intended to embrace the Lamellibranchiata, Gasteropoda, Pteropoda, and Cephalopoda. Later investigations and more extensive collections, rendered it necessary to divide these classes; and the Lamellibranchiata were presented to the public in 1884 and 1885, as Vol. V, part 1, in two volumes (pp. xviii, lxii and 562, with 96 plates.) Therein are described and illustrated over 500 species of this class of fossils, which are mostly from the Upper Helderberg, Hamilton, Portage and Chemung groups of New York, and including about thirty species from the Waverly group of Pennsylvania and Ohio. The volume V, part 2, embracing the Gasteropoda, Pteropoda and Cephalopoda of the same groups, was published in 1879, and also in two volumes. (Pp. xv, 492, with 113 plates, including 7 intercalated plates, making 120 plates.)

The sixth volume of the series will embrace the Corals and Bryozoans of the Lower Helderberg group, and the Bryozoans of the Upper Helderberg and Hamilton groups, and will contain about 300 pages and 65 plates.

The seventh volume will contain descriptions and illustrations of the Crustacea; also a supplementary addition to the subjects treated of in the fifth volume.

The eighth volume will contain a complete revision of the Palæozoic Brachiopoda of North America; intended to be illustrated in about sixty plates. Twenty-seven plates of these Brachiopoda, prepared for volume VIII, together with more than thirty plates of the Corals and Bryozoans of volume

VI, have been re-produced in photolithography, and with the explanations, appear in the annual report of the State Geologist for 1883.

Beyond the work enumerated, it has been Mr. Hall's wish to prepare a volume upon the palæozoic Corals of the State of New York, and some of the illustrations of the same have already appeared in a volume entitled "Illustrations of Devonian Fossils," printed by the Albertype process.

In 1855, Mr. Hall was offered, by Sir William E. Logan the Government geologist of Canada, the charge of the palæontology of the survey, with the promise of succeeding as director on the retirement of Sir William. The work in New York had been for some time suspended in default of appropriations, and Mr. Hall had already accepted the appointment, and was making preparations to remove to Montreal, when the Hon. E. W. Leavenworth, Secretary of State, appealed to the patriotism of Mr. Hall not to abandon the work in New York. Inviting to Albany Professor Agassiz, Sir William Logan, Professors Chester Dewey, James D. Dana and others, Mr. Leavenworth urged their influence to induce Mr. Hall to remain, while it was represented to a committee of the legislature that a work of such great scientific value should be sustained by a powerful and wealthy State. Confiding in the promises then made, which seemed well founded, and in the expectation of being sustained in his work, Mr. Hall decided to remain. But these conditions were never realized, and he has always regarded this decision, on his part, as the great mistake of his life.

Although not connecting himself with the Canada survey, he undertook the study and description of the graptolites of the Quebec group, which appeared as a "Decade of the Survey in 1865," an exhaustive monograph, illustrated by twenty-two plates, and forming, at that time, the most complete work known on this class of fossils. A review of this work, with additional material and illustrations, was subsequently published under the title of "An Introduction to the Study of the Graptolitidæ," appearing in the Twentieth Report on the New York State Cabinet of Natural History.

To these publications must be added the illustrations of organic remains, given in the government reports of various surveys, of Fremont, Stansbury, the United States and Mexican

Boundary survey, and others. Also numerous papers published in scientific journals and transactions of scientific societies, both here and abroad

"Professor Hall has also devoted much time to the study of crystalline stratified rocks, and was the first to point out the persistence and significance of mineralogical character as a guide to their classification, in the manner which has since been developed and extended by Hunt.* While devoting himself to the study of the minute details of organic structure, and discriminating between and classifying these with the utmost precision, Professor Hall has also successfully traced out and arranged in their true order, over vast areas of North America, the formations to which they belong, thus doing for the stratigraphical geology of our country a work second in importance only to that which he has done for its palæontology. Carrying his investigations still further, he has attempted the solution of some of the most difficult questions of dynamical geology, and has laid the grounds for a rational theory of mountains, which must be regarded as one of the most important contributions to geological science." †

The following comprise, according to dates, the order of noticable events in Mr. Hall's life: In 1831 and 1832 he received the degree of A. B. and A. M. from the Rensselaer School, and at a later date the degree of A. M. from Union College. In 1837 he was elected member ef the Imperial Mineralogical Society of St. Petersburg, Russia. In 1840 he was one of the founders and original members of the American Association of Geologists. This organization, with enlarged scope and changed title, is the present American Association for the Advancement of Science.

In 1843 he was elected correspondent of the Academy of Natural Sciences of Philadelphia. In 1845 he was elected member of the Geological Society of France. In 1848 he was elected foreign member of the Geological Society of London, the number of foreign members being limited to fifty. In 1848 he was elected Fellow of the American Academy of Arts and Sciences. In 1850 he was appointed judge in the Provincial Industrial Exhibition of Montreal. In 1854 he was elected member of the

* See GEOLOGY, Appleton's Cyclopædia.
† See MOUNTAIN, Appleton's Cyclopædia.

American Philosophical Society of Philadelphia. In 1856 he was elected president of the American Association for the Advancement of Science. In the same year he was elected honorary member of the Natural History Society of Montreal. In 1858 he published a report on the geology of Iowa ; subsequently, a report on the geology of Wisconsin.

In 1858 the Council of the Geological Society of London, of which he was a foreign member, awarded him the honor of the Wollaston medal. In 1859 he was made member of the Societas Cæsareæ Naturæ Curiosorum Mosquenses. In 1859 he was elected corresponding member of the Chicago Academy of Sciences. In 1860 he was elected corresponding member of the Naturhistorischen Gesellschaft in Nurnberg. In 1860 he was elected member of the Naturforchende Gesellschaft in Basel. In 1862 he was made honorary member of the Portland Society of Natural History ; and in 1863 honorary member of the Buffalo Society of Natural Sciences. In the same year he received the degree of LL. D. from the faculty and trustees of Hamilton College. In 1863 he was named, by an act of Congress, to be one of the fifty original members of the National Academy of Science.

In 1866, on the reorganization of the New York State Museum, he was appointed director. In connection with this office, which has required much thought and labor in systematizing the arrangement of the specimens, he has each year, in his annual reports, made valuable contributions to science. In 1867 he was elected a correspondent by the conchological section of the Academy of Natural Sciences of Philadelphia. In 1872 he was elected a member of the British Association for the Advancement of Science. In 1873 he was made corresponding member of the Société Royale des Sciences de Liège. In 1873 he was elected honorary member of the Minnesota Academy of Natural Sciences.

In 1876 he was one of the founders of the International Congress of Geologists, and president of the committee on its organization. He was one of the vice-presidents of this congress at the session in Paris in 1878 ; also at the session in Bologna in 1881, and at the session in Berlin in 1885.

In 1878 he was elected president of the Albany Institute, and re-elected to the same office in 1879. In 1879 he was made mem-

ber of the Academiæ Cæsareæ Leopoldina-Carolinæ Germanicæ Naturæ Curiosorum. In 1882 the King of Italy conferred on him the title and decoration of Commander of the Order dei Santi Maurizio é Lazzaro. In 1883 he was made corresponding member of the Academia Valdarnese del Poggio, Italy. In 1884 he was elected correspondent of the Academie des Sciences de l' Institute de France, and took his seat as member of the Institute in October, 1885. In 1884 he received the Walker quinquennial grand prize of one thousand dollars, awarded by the Boston Natural History Society. In the same year the degree of LL. D. was conferred upon him by McGill University of Montreal. In 1885 he was made correspondent of the Königliche Gesllschaft der Wissenschaften zu Göttingen.

WILLIAM ELDERHORST, M. D., was born September 30th, 1828, in the town of Celle, kingdom of Hanover, Germany. His father was lieutenant colonel in the Hanoverian army, and was appointed postmaster in the city of Hameln, on the Weser, about the year 1840. From the name William, instead of Wilhelm, being given to the son, it would appear that the King of Hanover and England, William IV, had consented to be his godfather, as is frequently the case with sons of meritorious officers.

In 1840 he entered the Gymnasium at Hameln, where he remained for two and a half years, until the fall of 1843. He then entered the Hanoverian artillery as cadet, and was discharged in February, 1845, by request of his father, on account of weakness of his eyes, from which he suffered during his whole life. In 1845 and 1846 he studied mathematics at the Höhere Gewerbe Schule in Hanover. He then went to the Georgia Augusta University, Göttingen, where he devoted his attention to chemistry, mineralogy and botany, until March, 1848. He was then occupied for a few months with analytical researches in the laboratory of the Probir-assistant.

He then returned to Göttingen, and continued his former studies until 1850, when he went to England and spent four months in the laboratory of the Horsley Fields Chemical Works, at Wolverhampton. In the winter of 1852–53 he was assistant professor of chemistry in the Polytechnic school at Stuttgart, but was obliged to leave on account of ill-health.

He came to this country in the late summer or early autumn of 1853. He first served for some months in a drug store in Charleston, S. C., and afterward in New York, at the same time giving private instruction in chemistry.

He was appointed professor of theoretical and practical chemistry, in the year 1855, in the Institute, and remained in this position until the time of his death in 1861. During this time he gave courses of lectures and instruction in the Medical College at Castleton, Vt., and New Harmony, Indiana. The degree of M. D. was conferred upon him by the former institution.

A manual of Blowpipe analysis was compiled by Prof. Elderhorst, and published in 1856, for use in his classes, there being at that time no text-book in English which seemed well adapted to the course of instruction then given. The second edition, revised and greatly enlarged, was published in 1860. Early in the month of May, 1861, Prof. Elderhorst went to Maracaibo, Venezuela, S. A., making a visit to the interior of the province, and returning early in July. On July 17th he was taken sick with yellow fever, and died on the 28th of July, 1861.

A memorial window was presented at the semi-centennial celebration, by the alumni and friends of Prof. Elderhorst, which is placed in the east end of Institute Hall.

James Theodore Allen, B. S., (Medfield, Mass.,) son of Ellis and Lucy (Lane) Allen, was born in Medfield, Norfolk county, Mass., August 29th, 1831. He attended Bridgewater State Normal School, Mass., in 1850, taught school in Easton during the winter, and in South Natick in 1851 ; during 1852–53 he was in Provincetown, Mass., teaching. He entered the Institute in April, 1854, and graduated in 1855. He was then appointed professor of English at the Institute and rector of the training school in connection therewith, 1855. After three years he resigned to study the languages. His health failing, he went to Germany ; traveled two years, and then connected himself, in 1860, with the English Classical School at Newton, Mass., where as associate principal he still remains. He is a member of the Webster Historical Society, Boston, Mass.

Married, August, 1860, Paulina A. Kittredge, daughter of Dr. E. A. Kittredge, of Lynn, Mass. ; four children. He tudied in Germany, Latin, Greek and German, 1872–74 ; and is now a

classical teacher, fitting pupils for Harvard, etc.; also teaches mathematics and higher classics. Traveled through Sweden, Norway, Denmark, and all Europe save Russia, Spain and Portugal; also through Greece, Turkey and Egypt in 1859–60.

DAVID MAXSON GREEN, C. E., was appointed professor of geodesy and topographical drawing in 1856, and resigned in 1861. He was re-appointed to the same professorship, including road engineering, in 1858. *See Directors, page 131.*

LOUIS COUSIN, B. L. and S. de la Faculte de Paris, was appointed professor of the French language and literature at the Institute in 1856 and resigned in 1859.

DASCOM GREENE, C. E., son of Benoni and Oracy (Clark) Greene, was born at Richmond, Ontario connty, N. Y., June 15th, 1825. For several years he attended the Genesee Seminary at Lima, N. Y., although not with a view to preparing for the Institute. He entered, Oct., 1851, intending to spend a year here, taking a special course; at the end of the year he decided to complete the regular course, and was examined and admitted to Division A, graduating July 28th, 1853. Was immediately appointed assistant professor of mathematics and practical astronomy at the Institute. After two years' service in that position, he was placed in charge of the department, at the beginning of the scholastic year 1855–56. Was elected a member of the American Association for the Advancement of Science in 1868. Published, in 1873, an "Elementary Treatise on Spherical Astronomy." Married, February 10, 1859, Sara I., daughter of Samuel Parsons, of Utica, N. Y. She died March 3d, 1861, leaving one son, who died September 20th, 1864. Married, July 19th, 1866, Elvira, daughter of Jairus Dickerman, of Troy, N. Y. November 7th, 1864, was elected professor of mathematics and astronomy at Lehigh University, Bethlehem, Pa., but declined the appointment.

HENRY BRADFORD NASON, Ph. D., M. D., LL. D., son of Elias and Susanna (Keith) Nason, was born at Foxborough, Norfolk county, Mass., June 22d, 1831. In November, 1841, moved to North Bridgewater, Mass., the native place of his mother, who had died the year previous. In 1843 he attended a school for

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boys kept by a Mr. Savory, at Newburyport, Mass. From 1844 to 1847 he attended the Adelphian Academy at North Bridgewater, (now Brockton,) Mass. In December, 1847, he entered Williston Seminary, Easthampton, Mass., graduating in 1851. Entered Amherst College, and graduated in 1855. On September 1st, 1855, sailed from New York to London, Eng., on the ship "Amazon," having a long passage of thirty-five days. He traveled through Holland, Belgium, up the Rhine to Frankfort, and then to Göttingen, where he was matriculated as a student of philosophy, October 24th, 1855. While connected with the University, he devoted his time to chemistry, mineralogy and geology, and also attended lectures on physics and botany, graduating in the summer of 1857. He then spent a short time at Heidelberg and Freiberg, and then visited Berlin, Paris and London, before returning to the United States.

He spent the winter of 1857–58 in teaching at the Raymond Collegiate Institute, Carmel, Putnam county, N. Y. In April, 1858, he was appointed professor of natural history in the Institute. In the summer, declined an appointment as professor of chemistry and natural science in Oahu College, Hawaian Islands. He accepted an appointment to the same chair in Beloit College, Wisconsin, in September, 1858, and spent a part of each year there, the remainder of the time at Troy, until 1866, when he resigned the position at Beloit to accept the professorship of chemistry and natural science at the Institute, which position he still holds.

From 1855 to 1857, while connected with the University, during vacations, he made the tour of Europe. In the spring of 1860 he traveled through the southern portion of the United States; sailed for Europe, July, 1861, and traveled through Great Britain; spent a term at Göttingen; thence to Italy, Sicily and Southern France, spending considerable time in the study of volcanic phenomena. Spent the summer of 1872 in California, Nevada and Idaho. In the autumn, made a second visit to California, visiting the mining regions of Colorado and Utah. In 1875, made a third trip to California, visiting the Yosemite, Northern California and Nevada. He spent the summer of 1877 in visiting Northern Europe, Finland and Russia. In 1877, he was appointed, by President Hayes, juror for the United States Government at the Paris Exposition, and was assigned the de-

partment of mineralogy and metallurgy. In 1884, visited Northern Europe, the fiords and glaciers of Norway, extending his travels to the North Cape.

He has published, "Inaugural Dissertation on the Formation of Ether," 1857; "Table of Reactions for Qualitative Analysis," 1865; translated and revised "Wöhler's Handbook of Mineral Analysis," 1868; "Table for Qualitative Analysis in Colors," 1870; edited Elderhorst's "Manual of Blowpipe Analysis," 1873; fourth and fifth editions of the same, 1875–76; edited "Manual of Blowpipe Analysis and Determinative Mineralogy," 1880; compiled "Semi-centennial Catalogue of the Rensselaer Polytechnic Institute," 1874; and edited "Proceedings of the Semi-Centennial Celebration of the same institution, 1874; edited "Biographical Record of the Officers and Graduates of the Rensselaer Polytechnic Institute," 1886.

In 1857, he received the degree of A. M. and Ph. D. from the Georgia Augusta University, Göttingen; in 1864, the honorary degree of A. M. from Amherst College; in 1880, the honorary degree of M. D. from the Union University of New York, and the same year the honorary degree of LL. D., from Beloit College, Wisconsin. He has been elected Fellow of the American Association for the Advancement of Science; Fellow of the London Chemical Society; Fellow of the Society of Chemical Industry, England; member of the American Chemical Society; corresponding member of the New York Academy of Sciences; member of the American Institute of Mining Engineers; member of the Troy Scientific Association; honorary member of the Albany Institute; member of the Norske Turistforenings, Christiania, Norway; elected member of the University Club, 1883, and of the Union League Club, New York city, 1886.

He united with the Congregational church, North Bridgewater, Mass., in 1848, and by letter with the First Presbyterian church, Troy, N. Y., in 1866, where he served as trustee for several years, and was elected ruling elder in 1874.

He married, September 7th, 1864, Frances Kellogg Townsend, daughter of the Hon. Martin Ingham Townsend, LL. D., Troy, N. Y. Two children, Henry Townsend Nason and Louisa Kellogg Nason, the latter deceased.

THOMAS NEWTON WILLSON, A. M., son of James S. and Tirzah (Humphreys) Willson, was born at South River, Rockbridge county, Virginia. In September, 1839, he was principal of common schools in Virginia, at intervals for six years; in 1847–48, was tutor in mathemetics in Washington College, Va.; in 1849–50, was principal of Mountain Academy, Tennesee; in 1850–53, was professor of mathematics in Oakland College, Miss.; in 1858–59, was professor of English composition, and rector of Institute Training School, Rensselaer Polytechnic Institute; since 1859 has been principal of Troy Academy. He received the honorary degree of A. M. from Washington College, Virginia. He was married January 30th, 1850, to Mary Caroline Evarts, daughter of Frederick Evarts. One son, Prof. F. N. Willson, of Princeton College, N. J.

CHARLES ANTHONY GOESSMANN, Ph. D., son of Dr. Henry and Helena (Bödiger) Goessman, was born at Naumberg, Hesse Cassel, Prussia, June 13th, 1827. He studied at the Latin School at Fritzlar, and for a time was a pharmaceutist. He entered the Georgia Augusta University, Göttingen, in the spring semester, 1850, and was graduated in the winter semester of 1853, receiving the degree of doctor of philosophy. He was then appointed privat docent in 1854, and remained until 1857. He then came to this country, and occupied the position of superintendent and chemist in the large sugar refinery of Messrs. Eastwick, in Philadelphia, Penn., remaining until the winter of 1860, when he went to Cuba, W. I., in December, visiting plantations and investigating methods until March, 1861. In April, 1861, he was appointed chemist to the Onondaga Salt Company, N. Y., and there remained as chemist and superintendent until January, 1869. He was chosen professor of chemistry in the Rensselaer Polytechnic Institute in 1861, and held the position until 1864, spending the winter months in Troy. In 1868 he was appointed professor of chemistry in the Massachusetts Agricultural College, at Amherst, Mass., which position he still retains.

He was appointed chemist of the State (Mass.) Board of Agriculture and state inspector of commercial fertilizers in 1873. In 1884 he was appointed analyst to the State Board of Health,

(Boston,) and director of the Massachusetts Agricultural Experimental Station, at Amherst, in 1883.

He was elected associate member of the Medical Society of the University of Erlangen, Bavaria, 1856; honorary member of the New York State Agricultural Society, 1861; Fellow of the American Association for the Advancement of Science, 1875, and is a member of the Buffalo, N. Y., Scientific Association, New York City Society of Natural History, and American Meteorological Society.

Dr. Goessman has published many articles in American and foreign journals, and many pamphlets and reports, relating to the manufacture of salt, of sugar, of beet sugar, and concerning fertilizers, and on other subjects.

He married, October 22, 1862, Anna Mary Kinney, daughter of Edward Kinney, of Syracuse, N. Y. Five children.

PHILIP H. BAERMANN, son of Hiram B. and Jette Baermann, was born in Bayersdorf, District of Erlangen, Bavaria, Germany, January 9th, 1816. He was appeinted professor of modern languages in the Rensselaer Polytechnic Institute in 1864, and remained so engaged till 1867. He had been engaged in teaching French and German, before coming to the Rensselaer Polytechnic Institute, at Mrs. Willard's Seminary, Troy, Albany Academy, Albany, Williams College, Mass., Troy University, Troy, and Alger Institute, Conn. In 1852 he was admitted as attorney and counselor of the Supreme Court of New York State. He was married in 1845 to Rose Ann Palmer of Troy, who died in March, 1875; one child. He was married again, to Matilda Lebeschulz, of South Carolina, who died in March, 1881.

WILLIAM HENRY SEARLES, C. E., son of Asbury M. and Rachel (Mitchell) Searles, was born in Cincinnati, Hamilton county, Ohio, June 4th, 1837. He prepared at Wesleyan University, Middletown, Conn., and the Scientific School of Yale College, entering the Rensselaer Polytechnic Institute in February, 1857, and graduating in 1860. In 1860–61, he was assistant engineer of the Marietta and Cincinnati railroad; in 1861–62, assistant engineer military defenses, department of the Ohio; in 1862-64, professor of geodesy and topographical drawing, Rensselaer Polytechnic Institute; in 1864, chief engineer Middle Range rail-

road, Michigan; in 1865–66, assistant engineer Pittsburgh, Fort Wayne and Chicago railroad; in 1866–67, principal assistant engineer Allegheny Valley railroad; in 1870–71, chief engineer Indiana North and South railroad; in 1872–73, chief engineer corps No. 7, New York, West Shore and Chicago railroad; in 1874–75, consulting engineer, New York; in 1876–78, division engineer New York State canals; in 1879–80, consulting engineer American Pier and Column company, New York; in 1881–82, division engineer New York, West Shore and Buffalo railroad; in 1883, chief engineer Williamsport and Clearfield railroad, Penn.; in 1884, assistant chief engineer B. C. Clearfield and S. W. railroad. He is at present civil and consulting engineer, Cleveland, Ohio. He built the Indiana North and South railroad, the West Point tunnel at West Point, N. Y., and the railroad lift bridge for the B. C. C. and S. W. railroad over the west branch of the canal, Jersey shore, Penn. He is a member of the American Society of Civil Engineers. He published "Field Engineering," "Railroad Spiral" and several papers in "Transactions of the American Society of Civil Engineers," etc.

He was married June 8th, 1870, to Mary J. Doolittle, daughter of Hon. Charles H. Doolittle, of Elyria, Ohio.

CHARLES MCMILLAN, C. E., son of Alexander and Elizabeth (Platt) McMillan, was born in Moscow, Russia, March 24, 1841. His special preparation for the Institute was with a private teacher, having been previously educated at the Protestant Chapel, Moscow, the School of the Lutheran church, Moscow, and the public schools of Hamilton, Canada. He entered the Institute in September, 1856, and was graduated in 1860. In 1860 he was draughtsman, Brooklyn water works, Brooklyn, N. Y.; in 1861–63, draughtsman, Croton water works, New York; in 1863, assistant engineer in charge of pipe distribution and rates of engines; in 1864, assistant engineer in the construction of the new reservoir in Central Park, New York; in 1865, civil engineer, (McMillan & Gould,) Titusville, Penn.; in 1865, professor of geodesy and topographical drawing, Rensselaer Polytechnic Institute, Troy, N. Y.; in 1866–71, professor of geodesy, road engineering and topographical drawing, Rensselaer Polytechnic Institute, Troy, N. Y.; in 1871–75, professor of civil and mechanical engineering, Lehigh University, Bethlehem, Penn.; in 1875 to date, professor

of civil engineering and applied mathematics, College of New Jersey, Princeton, N. J., and was also consulting engineer in Troy, N. Y., Bethlehem, Penn., and Princeton, N. J.

He designed and built the arched bridge, and the upper lake, in Oakwood Cemetery, Troy, N. Y.; the sewerage of Theological Seminary, Princeton, N. J., and the sewerage of Princeton, N. J. He was school commissioner from the third ward, Troy, N. Y., in 1870–71. He is a member of the American Society of Civil Engineers, also of the Rensselaer Society of Engineers. He edited "Smith's Topographical Drawing," and also published a pamphlet entitled "Disposal of Town Sewage," in the report of the New York State Board of Health for 1882.

He was married July 17th, 1866, to Henrietta J. Dodge, daughter of R. J. Dodge, of Brooklyn, N. Y., and October 31st, 1878, Annis T. Field, daughter of the late R. S. Field, of Princeton, N. J.

GEORGE WILLIAM MAYNARD, A. M., son of George Washington and Caroline Augusta (Eaton) Maynard, was born in Brooklyn, Kings county, N. Y., June 12th, 1839. He was educated at Columbia College, the University of Göttingen, and the Mining School at Clausthal, Germany. In January, 1863, he was metallurgical manager of mines in Ireland. From 1864 to 1867 he was engaged in mining engineering, for the most part in Colorado, and was manager of chemical works for a year following. From 1868 to 1872 he was professor of mining and metallurgy at the Rensselaer Polytechnic Institute, and at the same time consulting engineer for iron and steel works in Troy and elsewhere. From 1873 to 1879 he was consulting engineer for iron, steel and copper works in England, Germany and Russia. From 1879 to date he has been engaged in the general practice of his profession in the United States, and is now president of the Bower Iron company. He has built works in Ireland and Colorado, mills, dressing works, and Russian metallurgical plant for treating coper ores. At present he is constructing a furnace for metallurgical purposes.

He received the honorary degree of A. M. from Columbia College, New York, and is a member of the American Institute of Mining Engineers, New York Academy of Sciences, American Geographical Society, American Society of Mechan-

ical Engineers, Long Island Historical Society, and the Iron and Steel Institute of Great Britain.

He has written sundry mining and technical reports, contributions to the Iron and Steel Institute, and the American Institute of Mining Engineers, also articles in various technical journals at home and abroad.

He was married June 12th, 1865, to Fannie Atkin, daughter of John H. Atkin. Three children living.

R. HALSTED WARD, A. M., M. D., F. R. M. S., was born in Bloomfield, Essex county, N. J., June 17th, 1837. He was the eldest son of Israel C. and Almeda H. Ward. After a preparatory course in the local schools, he entered Williams College at the age of seventeen, and was graduated at twenty-one. (A. B. in 1855; A. M. in 1861.) While in college he was president of the Philotechnian Literary Society, editor of the *Williams Quarterly*, and a most active member of the "Florida Expedition" (1857), one of the first and most successful of the parties that have been sent out from various colleges for the purpose of scientific study and collection.

After a thorough course of study in the medical schools and hospitals of New York and Philadelphia (M. D. from College of Physics and Surgery, New York, 1862), a short service in the United States military hospital at Nashville, Tenn., and a short residence, as a sanitary measure, in Minnesota, he established in Troy, in 1863, the system of family medical practice which has been maintained uninterruptedly ever since. He is a member of the Rensselaer County Medical Society (president in 1877, and re-elected in 1878); of the American Medical Association, and was a delegate to the International Congress, held in London in 1881. Several of his papers on medical subjects have been published in the transactions of the State Medical Society. He is also a member of the Medical Board (since 1868), and of the Board of Governors (since 1868, and secretary since 1883), of the Marshall Infirmary.

His scientific work, outside the medical profession, originated from a fondness while in college for botany, biology and microscopy, and has maintained the same direction ever since. He was appointed instructor of botany at the Rensselaer Polytechnic Institute in 1867, and was made professor of botany the

following year. He has also delivered courses of lectures on microscopy at the Institute on several occasions, and is lecturer on microscopy in the scientific course lately established. Outside the Institute his scientific lectures have been numerous, and have seldom failed to touch in some way his favorite subject of the practical applications of science.

His original work in the advancement of science has been mostly in the direction of microscopy, in which he was among the first to apply the microscope to the discrimination of different kinds of blood in connection with criminal trials, and to the detection of forgery, erasures, and other falsifications in handwriting. Besides introducing the microscope as a critical element in many important criminal trials, he has made it prominent and important in many legal, medical, sanitary and economical cases pertaining to water supply, adulterations of food and medicine, special causes of disease, etc. Finding the existing standards of measurement quite unsatisfactory for work of such precision, he took a leading part in organizing the "National Committee on Micrometry," and in securing the standard micrometer, which is now acknowledged as authority for such purposes. Among his inventions and contrivances for the improvement of the microscope are an illuminating arrangement for binoculars, a safety mailing box for slides (used by the Postal Club), an eye shade, the iris illuminator, and a lens holder for dissecting purposes.

Professor Ward is author of the elaborate article on microscopy in *Appleton's Annual Cyclopedia* for 1884; and editor, conjointly with Rev. A. B. Hervey, of the American revision of Behrens on the *Microscope in Botany*, (Boston, 1885,) to which work he made extensive critical contributions respecting the microscope and its accessories. His numerous scientific papers, published during the last twenty years, have pertained mostly to such practical subjects as the practical uses of the microscope; medical microscopy; the study of blood and handwriting; micrometry; illumination; the powers, aperture and nomenclature of objectives and oculars; student's, dissecting and binocular microscopes, etc. His papers have been mostly published in the *Proceedings of the American Association for the Advancement of Science*, and of the *American Society of Microscopists;* in the *American Naturalist*, (Philadelphia,) *American Monthly Microscopical*

Journal, (Washington,) the *Microscope*, (Ann Arbor,) the *Monthly Microscopical Journal*, (London,) the *Journal of the Royal Microscopical Society*, (London,) the *Journal de Micrographie*, (Paris,) the *Microscopical Bulletin*, (Philadelphia,) etc. Many of them have been republished in pamphlet form and extensively circulated. For twelve years he was associated with the editorial corps of the *American Naturalist*, having established (1871) the department of microscopy of that journal—the first microscopical department established by any scientific journal in this country; and during that time he contributed a monthly budget of critical notes in regard to that branch of science, which were prepared with such care and judgment as to be constantly quoted as authority.

His connection with numerous scientific societies has brought him into intimate relations with the most advanced scientific work and progress of the times. He was first president of the Troy Scientific Association (1870–77), and of the American Society of Microscopists (1879); is manager of the American Postal Microscopical Society (since its formation in 1875); member of the American Metrological Society; Fellow of the American Association for the Advancement of Science (chairman of the sub-committee of microscopy in 1876, re-elected in 1877); Fellow of the Royal Microscopical Society (London); and associate member of the British Association (1881–84); honorary member of the Belgium Microscopical Society; Minnesota Academy of Science; Louisville Microscopical Society; Microscopical Society of Central Illinois; Phi Beta Kappa Society; etc.: and correspondent of the Albany Institute; Boston Society of Natural History; San Francisco Microscopical Society; American Microscopical Society of New York; Indianapolis Academy of Science; State Microscopical Society of Illinois; Memphis Microscopical Society; Tyndall Association of Columbus, etc.

He was married in 1862 to Charlotte A. Baldwin, daughter of Caleb D. Baldwin, of Bloomfield, N. J., and has four children.

J. H. C. LAJOIE DE MARCELEAU, A. B., was instructor in the French language from 1866 to 1869, and was appointed professor of the French language and literature in 1869. He resigned in 1873. He published, while at the Institute, in 1869, "Dictées Corrigées of Orthographical Exercises," for his classes, and it

was adopted in other institutions. After his resignation, he went to Canada, and there engaged in mercantile pursuits.

DWINEL FRENCH THOMPSON, B. S., son of Joel Dwinel and Harriett Newell (French) Thompson, was born in Bangor, Penobscot county, Maine, January 1st, 1846. He prepared for college, and entered Bowdoin College, where he remained for two years, and then went to Dartmouth College, Hanover, N. H., where he was graduated in the scientific department in 1869. He then received the appointment of tutor in the same institution, and remained three years. In 1872 he was appointed professor of descriptive geometry, stereotomy and drawing in the Institute, which position he still holds. He married, January 1st, 1880, Mary Lena Saxton, daughter of S. Burt Saxton, of Troy, N. Y.; three children.

WILLIAM LAWSON ADAMS, C. E., was appointed professor of geodesy, road engineering and topographical drawing in 1872, and resigned in 1878. *See Directors, page 130.*

ROBERT PARR WHITFIELD, A. M., son of William and Margaret (Parr) Whitfield, was born May 27th, 1828, in New Hartford, Oneida county, New York. He received his early education mostly at home. He began his work at Albany, N. Y., on the palæontology of the State of New York in 1856, and continued until 1876, the records being found in the "State Natural History." He was assistant curator of the State Museum, Albany, from March, 1870, to February 28th, 1876. Professor Whitfield was appointed professor of geology in the Institute in 1875, and held the position until 1878. He was appointed curator of the geological department of the American Museum of Natural History, New York city, June 1st, 1877, which position he still holds.

He is a member of the Albany Institute, Albany, N. Y.; Fellow of the American Association for the Advancement of Science, and corresponding member of the New York Microscopical Society.

He was married July 28th, 1847, to Mary Henry, daughter of William Henry. Five children.

The following is a list of works written by Professor Whitfield:

Observations on the Rocks of the Mississippi Valley and Descriptions of new species of Fossils. By C. A. White and R. Whitfield, Proceedings Boston Society of Natural History, 1862.

Description of new species of Eocene Fossils. By R. P. Whitfield, (American Journal Conchology, July 1st, 1865, vol. 1).

Observations on the internal appendages of the genus Atrypa. By R. P. Whitfield, (twentieth report State Cabinet, New York, 1867).

Description of new species of Fossils from the Devonian rocks of Iowa. By James Hall and R. P. Whitfield, (twenty-third report State Cabinet, New York, 1869, page 223).

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Notice of some new species of primordial fossils in the collection of the museum, and correction of previously described species. By R. P. Whitfield, (Bulletin No. 5 of the American Museum of Natural History, 1884).

On a fossil scorpion from the Silurian rocks of America. By R. P. Whitfield, (Bulletin No. 6 of the American Museum of Natural History, 1885).

Notice of a new cephalopod from the Niagara rocks of Indiana. By R. P. Whitfield, (Bulletin No. 6 of the American Museum of Natural History, 1885).

Notice of a very large species of Homalonotus from the Oriskany sandstone formation. By R. P. Whitfield, (Bulletin No. 6 of the American Museum of Natural History).

WILLIAM HUBERT BURR, C. E., son of George William and Marion F. (Scovill) Burr, was born in Watertown, Litchfield county, Conn., July 14th, 1851; prepared by private tutor, entered the Institute October, 1868, and was graduated in 1872. From August, 1872, to March, 1873, he was assistant engineer with the Phillipsburgh Bridge Company, Phillipsburgh, N. J., and New York city. March, 1873, to December, 1873, was assistant engineer on the Newark, N. J., water works. January 1874, to May, 1875, was assistant engineer with the Phillipsburgh Bridge Company. September, 1875, to December, 1876, he was acting professor of theoretical and practical mechanics at the Rensselaer Polytechnic Institute, and from December, 1876, to June, 1883, was professor of rational and technical mechanics; from June, 1883, to September, 1884, was the "William Howard Hart" professor of technical and rational mechanics. In April, 1884, he accepted the position of assistant to the vice-president, and chief engineer of the Phœnix Bridge Company, Phœnixville, Pa. He is a member of the American Society of Civil Engineers, the American Association for the Advancement of Science, and the Rensselaer Society of Engineers. Published a "Course on the Stresses in Bridge and Roof Trusses, Arched Ribs, and Suspension Bridges," New York, 1880; "The Elasticity and Resistance of the Materials of Engineering," New York, 1883; "The Theory of the Masonry Arch," Troy, N. Y., 1881. Married, September 7th, 1876, Caroline Kent Seelye, of Ballston Spa, N. Y.; two children.

ARTHUR WELLINGTON BOWER, C. E., was born September 25th, 1846, at Pleasant Valley, N. Y. He had spent some time in teaching before entering the Institute in the fall of 1867. He was graduated in 1871, and was instructor in mathematics and mechanics in the Institute from 1871 to 1874. In 1874 he was appointed assistant professor of mathematics and instructor in mechanics. In 1875 he was appointed assistant professor of

physics, and in 1878, professor of physics, which position he held until his resignation in 1880. Prof. Bower was married about 1877. Since leaving the Institute, he has been engaged at various places in the west in stock raising. He now resides at Stanford, Meagher Co., Montana.

FRANK PERKINS WHITMAN, A. M., son of William W. and Caroline K. (Perkins) Whitman, was born in Troy, Rensselaer county, N. Y., July 29th, 1853. Graduated at Brown University, Providence, R. I., in 1874. Was teacher of natural science and mathematics in an English and Classical School at Providence, R. I., 1874–78. Was a student in physics at Brown University and the Massachusetts Institute of Technology, Boston, 1878–79, and at the Johns Hopkins University, Baltimore, Md., 1879–80. Was appointed professor of physics at the Institute in 1880, which position he still holds. He received the degree of A. M. from Brown University, 1877. Married, May 26th, 1881, Charlotte W. Wheeler, daughter of Rev. Charles H. Wheeler, of Providence, R. I.

PALMER CHAMBERLAIN RICKETTS, C. E., son of Palmer P. and Eliza (Getty) Ricketts, was born in Elkton, Cecil county, Md., January 17th, 1856 ; moved to Princeton, N. J., and was prepared for college by Mr. Obrien, tutor of Princeton College. He entered the Institute in September, 1871, and was graduated in 1875. In September, 1875, was appointed assistant in mathematics and astronomy at the Institute. During the summers of 1876 and 1877 engaged as assistant engineer on the Troy & Boston railroad. From 1882 to 1884 was assistant professor of mathematics and astronomy, and in 1884 was appointed to the William Howard Hart professorship of rational and technical mechanics at the Institute, which position he now holds.

WILLIAM PITT MASON, C. E., B. S., M. D., son of James and Emma (Wheatly) Mason, was born in New York city, October 12th, 1853. Prepared at Bernard French Institute, New York city. Entered the Rensselaer Polytechnic Institute in September, 1870, and was graduated in 1874. The following year was spent in Europe and in the chemical laboratory of Harvard University. He was appointed assistant in chemistry and natural science in the Institute in September, 1875 ; assistant

professor of chemistry and natural science in 1882, and professor of analytical chemistry in 1885, which position he now holds. He studied medicine, and received the degree of M. D. from Albany Medical College, March, 1881. Edited "Notes on Qualitative Analysis," September, 1882. Was married April 29th, 1886, to Emilie Eliza Harding, daughter of George Harding, of Philadelphia, Pa.

ASSISTANT PROFESSORS.

TIMOTHY ORLANDO HOPKINS, C. E., son of Hon. Timothy A. and Hannah (Williams) Hopkins, was born at Amherst, Erie county, N. Y., May 14th, 1832. Graduated at the Albany State Normal School in 1851 ; taught on Long Island and in Buffalo two or three years ; entered the Institute in 1854, and graduated in 1857. After graduation, was appointed assistant professor of mathematics and repeater of mechanics, and remained two years, until 1859. In 1859–60 he taught in the Normal School at Joliet, Ill., and in the spring of 1861 went to California. In 1862, he was elected surveyor of Alameda county, Cal., which position he held at the time of his death, January 23d, 1865.

WILLIAM FENTON, C. E., was born in Essex county, England. July 12th, 1832. Emigrated to America in 1846. Previous to entering the Rensselaer Polytechnic Institute, he attended the Polytechnic College, Philadelphia, Pa., one year, and for the year 1858 held the office of city engineer of West St. Paul, Minn. In the fall of 1859 he entered the Rensselaer Polytechnic Institute (Division B), and graduated in 1861. The summer of 1862 was spent drawing plans for, and assisting in the superintendence of the erection of a block of buildings in St. Paul, Minn. In the fall of 1862 he went to Brooklyn, N. Y., and during that winter and part of the following summer he taught an evening school for mathematics and drawing, being employed during the day in the construction of the "Iron Clads," at the Continental Works, Greenpoint, L, I. The latter part of the summer of 1863 he was employed as assistant in the city engineer's office at Jersey City. He was appointed instructor in mathematics and geodesy in the Institute from 1863 to 1865, and assistant professor of the same from 1865 to 1870. Under an

impression of a call to preach the gospel, this position was resigned. In the fall of 1870, he entered upon a course of theological studies in the Baptist Theological Seminary, Chicago, Ill. In the year 1872 he was ordained to the gospel ministry at the Baptist Church of Lamartine, Wis. Soon after he discovered the nature and character of Freemasonry, and its power over the churches. For the past few years he has been engaged in various occupations, principally lecturing against Freemasonry and preaching the gospel in the streets, and in churches when permitted. In 1868 he was elected a member of the American Association for the Advancement of Science, and previous to that time was elected a member of the American Association of Civil Engineers.

HENRY AUGUSTUS ROWLAND, C. E., Ph. D., son of Rev. Henry A. and Harriet (Heyer) Rowland, D. D., was born in Honesdale, Pa., November 27th, 1848. He prepared for the Institute at the Academy in Newark, N. J., entered in the fall of 1866, and graduated in 1870. He surveyed a railroad in western New York; taught in Wooster University, Wooster, Ohio, for six months; was instructor in physics in the Institute from 1872 to 1874, and assistant professor of physics from 1874 to 1875. Passed one year in Europe, examining physical laboratories, and studying in Helmholtz' laboratory. Was appointed professor of physics in Johns Hopkins University in 1876. Received the honorary degree of Ph. D. from Johns Hopkins University, 1880; Chevalier of the Legion of Honor, Paris, 1881; received the Rumford medal in 1884, for researches in light and heat. He is associate member of the American Academy of Science, Boston; member of the Physical Society of London; corresponding member of the British Association; member of the National Academy of Sciences; member of the Electrical Congress at Paris, 1881, and of the jury of the Exposition, and permanent member of the International Commission for establishing electrical units; was vice-president of the American Association for the Advancement of Scienec in 1883. Has edited various papers in the scientific journals.

ADOLFO ELEUTERIO BESOSA, C. E., was born in Ponce, Porto Rico, April 18th, 1856. He was graduated at the Institute in

1875, and then went abroad and spent some time as a student of engineering in Paris, France. In 1880 was appointed assistant in rational and technical mechanics in the Institute, to which descriptive geometry and drawing were added the following year. In 1882 he was appointed assistant professor in the same department, and resigned in 1883.

CHARLES WINTHROP CROCKETT, A. B., C. E., son of Earlsworth and Elizabeth (Holden) Crockett, was born at Macon, Bibb county, Ga., October 6th, 1862. Graduated from Mercer University, class of 1879, receiving the degree of A. B. Entered the Institute October 2d, 1880, and graduated in 1884. He was then appointed assistant professor of mathematics and astronomy in the Institute, and entered upon his duties in the fall of 1884.

INSTRUCTORS.

GEORGE WASHINGTON PLYMPTON, C. E., A. M., son of Thomas Ruggles and Elizabeth (Holden) Plympton, was born in Waltham, Middlesex county, Mass., November 18th, 1827. Learned the machinist trade, 1844 to 1847. Prepared for the Rensselaer Polytechnic Institute in the Waltham High School, and with Rev. Thomas Hill. He was graduated in 1847, and was for a time instructor in mathematics at the Institute. Engaged in farm, road and plank road surveying in Essex, Rensselaer, Greene and Dutchess counties, N. Y., in 1850; 1851–52, at Cleveland, Ohio, in city street work; from 1852 to 1855 was professor of mathematics at Albany State Normal School; 1856–57, he built bridges with J. W. Murphy; 1859–63, taught physics and engineering at the Trenton State Normal School. Has been professor of physical sciences in the Brooklyn Polytechnic Institute from September, 1863, to the present time; professor of chemistry and toxicology in Long Island College Hospital from March, 1865; professor of physics and engineering at Cooper Institute from November, 1869; director of the Cooper Union night schools since September, 1881; has edited Van Nostrand's Engineering Magazine since January 1st, 1870. He built an iron railway bridge at Allentown, Penn.; an iron bridge, two span, double track, at Beaver Meadow, Penn., in partnership

with J. W. Murphy, of the class of 1848. Designed the drainage of the city of Bergen, (now part of Jersey City), as engineer for the Water Board, in 1867–68. Received the honorary degree of A. M. from Hamilton College, and the degree of M. D. from Long Island College Hospital. Aside from work for Van Nostrand's Magazine, he has made several translations from the French, as "Guide to Determination of Rocks," "The Aneroid and how to use it," "Theory of Ice Machines." Married, December 17th, 1855, Delia M. Bussey, daughter of Col. Thomas Bussey, of Troy, N. Y., who died April, 1859, leaving one son; married, July 2d, 1861, Helen M. Bussey; four children. Has been a member of the American Society of Civil Engineers since 1868.

DAVID HATHAWAY was instructor in linear and perspective drawing in the Institute from 1847 to 1850.

PAUL EDWARD VON THUN was instructor in the French and German languages in the Institute from 1852 to 1854.

JOSEPH A. MOAK, C. E., son of Robert and Mary (McMillen) Moak, was born at New Scotland, Albany county, N. Y., August 15th, 1830. He prepared for the Institute at the district school in New Scotland, and Schoharie Academy, Schoharie county, and entered in 1852. He was graduated in 1854, and was instructor in field geodesy from 1854 to 1855. He commenced surveying, and then went South as civil engineer, deepening and widening Appomattox River in Virginia, and afterward opened an office in Richmond, Va. He married in June, 1859, Sarah West. One child. He died during the war.

LEWIS GOULD LOWE, C. E., B. N. S., A. M., M. D., son of Abraham and Emma (Burr) Lowe, was born in Boston, Suffolk county, Mass., August 17th, 1828. He attended Phillips Academy, at Andover, Mass., the Bridgewater State Normal School, at Bridgewater, Mass., and entering the Institute in 1847, was graduated in 1848. He was instructor in natural sciences in the Rensselaer Polytechnic Institute during the summer term of 1850, and for a part of one summer afterwards (1855); assisted the principal of the State Normal School, Bridgewater, Mass., and studied medicine from 1860 to 1864, and practiced that pro-

fession in Bridgewater from 1864 to 1869, giving up the practice on account of poor health. He then engaged in the insurance business, together with the superintendence of a farm in Bridgewater. In the winter of 1876–77 he was sent as Representative to the Massachusetts State Legislature from Bridgewater, and served several years as school committee in Bridgewater. He received the degrees of C. E., B. N. S., and A. M. from the Rensselaer Polytechnic Institute, also of M. D. from the New Hampshire Medical College, 1863, and from the Medical College of Harvard University, 1864. He married, April 29th, 1850, Joanna, daughter of Mr. Jacob Jackson. Ten children; nine living. In 1862 he served in the Union army for three months as acting medical cadet, stationed at Judiciary Square hospital, Washington, D. C., but resigned to attend the winter course of lectures at the Harvard Medical School.

De Volson Wood, C. E., M. S., A. M., son of Julius and Amanda (Billings) Wood, was born in Smyrna, Chenango county, N. Y., June 1st, 1832. After graduating from the Normal School at Albany, he entered the Institute October, 1855, and was graduated in 1857. He was instructor in mathematics in the Institute from 1856 to 1857. Began teaching at 17 years of age, and still continues; was assistant professor of civil engineering in the University of Michigan, 1857; professor of civil engineering in the same university from 1859 to 1872; was appointed professor of mathematics and mechanics in the Stevens Institute, Hoboken, N. J., 1872. Designed ore dock at Marquette, Mich., 1866. Was President of the Board of Education, Boonton, N. J., in 1881. Received the honorary degree of M. S. from the University of Michigan, and A. M. from Hamilton College. Is a member of the American Society of Civil Engineers, the American Society for the Advancement of Science, corresponding member of the American Society of Architects. He wrote "Resistance of Materials," 1871; a "Treatise on Bridges and Roofs," 1872; "Analytical Mechanics," 1876; "Elementary Mechanics," 1878; "Co-ordinate Geometry," 1879; "Mechanics of Fluids," 1884. Married, September, 1859, Cordera E. Crane, who died June, 1866; one child. Married, August, 1868, Fannie M. Hartson; six children.

JAMES R. PERCY, B. S., of Fowler's Mills, Ohio, was born at Pike River, Canada East, September 18th, 1829. He entered the Institute in 1856, and graduated in 1859. He had taught in public schools before coming to Troy, and was instructor while pursuing his engineering course. He was also engaged in teaching in Ohio, after graduation. He entered the United States service November 16th, 1861, remaining in the army until he was killed at Atlanta, Ga., August 18th, 1864. In 1874 a stained glass memorial window was placed in the Institute library room, by his classmates, bearing the inscription of the engagements in which he took part: Pittsburg Landing, Vicksburg, Mission Ridge, Resaca, Kenesaw Mountain, Atlanta.

JOHN B. LUCE, A. M., was instructor in the French language and literature from 1860 to 1861. He was born in France, February 3d, 1785, and died in Troy, N. Y., January 12th, 1865. He was buried in Oakwood cemetery, and a suitable monument was placed for him by a friend and pupil.

JOSEPH G. FOX, C. E., son of Buell and Prudence (Ely) Fox, was born in Adams, Jefferson county, N. Y., September 7th, 1833. Until 1848 he remained at home on a farm; from 1848 to 1853, was an apprentice in a cabinet and chair factory at Adams, attending the Adams Academy a portion of the time. From 1853 to 1855 was proprietor of a cabinet and chair factory at East Saginaw, Mich. 1855–56 was a student at the Union Academy, Belleville, N. Y. 1856–57 was a student at the State Normal School, Albany, N. Y., graduating July, 1857. 1857–58 was principal of the West Troy Academy, West Troy, N. Y. 1858–59, associate principal of the Paulding Institute, Tarrytown, N. Y. He entered the Rensselaer Polytechnic Institute in September, 1859. While pursuing his course at the Institute he acted as instructor in mathematics, and on graduating, in 1861, he was appointed instructor in geodesy and topographical drawing. In 1862 he accepted a position in the city of New York, where for the next ten years (1862–72,) he was a resident, and engaged in teaching, chiefly as principal of the Collegiate and Engineering Institute, and also holding the position of professor of mathematics in Cooper Institute in 1863–64, and for seven years following was director and professor of mechan-

ics in the same institution. In 1872 he was elected to the chair of civil and topographical engineering in Lafayette College, Easton, Pa. He received the honorary degree of A. M. from Columbia College, 1864. Is a member of the American Association for the Advancement of Science. Married, September 1st, 1864, Lina Sutherland, daughter of Allen M. Sutherland; three children.

HORACE LOOMIS, C. E., son of Benjamin N. and Sarah A. (Gardiner) Loomis, was born in Binghamton, Broome county, N. Y., July 14th, 1840. He prepared for the Institute at the Binghamton Academy and State Normal School, Albany. He entered in September, 1862, and was graduated in 1865. During these three years he was also instructor in mathematics and English composition. From August, 1865, on the Lehigh Valley railroad, Wilkesbarre, Penn., one year; Western and Connecticut and Dutchess and Columbia railroad, Dutchess county, N. Y., one year; Erie railroad, Hoboken, N. J., three years; Midland railroad, Jersey City, seven years; private work, three years. He designed and built the railroad stock yards, docks, etc., for the Erie railroad at Hoboken and Weehawken, N. J.; old White Plains post road improvement, Westchester county, N. Y.; Jersey City and Albany railroad, in Rockland county, N. Y.; Gravity railroad, Cumberland county, Maryland; additional water supply for New York city from the Housatonic river, Conn. He has been trustee and president of the village of Mount Vernon, is a member of the American Society of Civil Engineers, and published "Reports to the Department of Public Works on Additional Water Supply." He married, May 10th, 1871, Kate A. Chabert, daughter of Dr. R. F. Chabert, of Hoboken, N. J. Six children.

GEORGE MARSHALL HUNT, C. E., son of Marshall and Lydia (Gibbs) Hunt, was born in St. Armand, Missisquoi county, Province of Quebec, September 2d, 1826. He attended Morrisville Academy, Morrisville, Vt., Lawrence Academy, Groton, Mass., and Charlotteville Seminary, Charlotteville, N. Y. He entered the Rensselaer Polytechnic Institute in September, 1859, remaining one year. He re-entered in September, 1864, and was graduated in 1866. In 1852 he commenced teaching, and has taught

more or less every year since. In 1855 he was granted a State teacher's certificate, by the State department of public schools of the State of New York. He learned the tanner's and currier's trade before he was twenty-one years of age, and also learned the carpenter's and joiner's trade. In 1851 he was assistant section engineer on the Fitchburg railroad; March, 1884, in Argyle, N. Y., was elected to the office of commissioner of roads and bridges. He married, December, 1856, Jane Eliza Lester, daughter of John Lester. Since 1876 he was engaged in experimenting upon the steam engine. A successful rotary steam engine was the object sought. He was instructor in mathematics in the Institute from 1864 to 1866; instructor in mathematics and and analytical mechanics, 1866–67; principal of Hartford Academy, N. Y., 1867–68, and of Hebron Academy, N. Y., 1868–69, and afterward taught at Argyle. He died at North Argyle, N. Y., April 6th, 1886.

CHARLES EDWARD ILLSLEY, A. M., C. E., son of Edward and Nancy (Selleck) Illsley, was born in New York city, May 29th, 1842. His parents removing to St. Louis, he attended the St. Louis High school, and then took a collegiate course at Washington University in the same city. He entered the Institute in October, 1865, and was graduated in 1867. Was instructor in English composition at the Institute from 1866 to 1867 ; instructor in mathematics, drawing and civil engineering at Washington University, St. Louis, one year after graduation at Troy. He had three years' practical engineering work in street construction department at St. Louis, and then began practice as an architect. Received the degree of A. M. from Washington University. Was president of the Western Association of Architects, Chicago, Ill., in 1884. He married, September 3d, 1877, Sarah E. Godlove, daughter of Emanuel Godlove, of St. Louis, Mo. Four children; three now living.

ALBERT HORATIO GALLATIN, A. M., M. D., son of Albert Rolar and Mary Lucille (Stevens) Gallatin, was born in New York city March 7th, 1839. He was instructor in physics from 1866 to 1867 in the Institute, and has held the positions of professor of chemistry, geology and minerology in Norwich University, Vermont; professor of analytical chemistry and director of the

laboratory, Cooper Union, New York; professor of analytical chemistry, University of the city of New York, which position he still holds. He is a member of the New York Academy of Medicine. He was married September 7th, 1877, to Louisa Belford Ewing, daughter of Lieutenant Maskell Ewing, U. S. A. Three children.

ALEXANDER GEORGE JOHNSON, A. M., son of David and Lucy (Towne) Johnson, was born at Newbury, Vt., February 7th, 1813. He practiced law in Troy, N. Y., and was editor of the Troy *Whig* for about ten years before his death. He was deputy secretary of state about 1851; also deputy superintendent of public instruction at two other different times. He was a graduate of Dartmouth College, and received the honorary degree of A. M. from the same college. He married Charlotte Ward, daughter of Hon. Andrew Ward, of Windsor, Vt., in 1846. Eight children; five now living. He died February 7th, 1879.

CHARLES EDWARD SMITH, C. E., was born in Mobile, Ala., July 24th, 1841. He came north and entered Mr. Roe's preparatory engineering school, May, 1856, at Cornwall-on-the-Hudson. He entered the Rensselaer Polytechnic Institute in the fall of 1857, and graduated in June, 1860. He obtained work first on the Bergen tunnel, near Jersey City, merely a temporary job, given because the assistant engineer was disabled for a few days by an accident. He obtained a position as assistant engineer on the Raritan and Delaware Bay railroad sometime during the summer of 1860, but left when the work was temporarily suspended a few months afterward. After a short interval was recalled and remained until the beginning of the war of secession, when he went South and enlisted as a private in the Third Alabama infantry regiment, which he joined at Norfolk in October, 1861. He was attacked with what subsequently proved to be chronic diarrhœa just before the evacuation of Norfolk, but accompanied the regiment as far as Richmond, where he was taken to the hospital, while the Third went into the series of battles beginning with Seven Pines. In a few weeks he was detailed as hospital clerk, and after holding that place about a year his detail was transferred to the engineer department, as draughtsman, within one month from which time he received a

commission as second lieutenant of engineers, and was retained on duty in the engineer bureau of the war department. In May, 1864, he was, at his own request, ordered to field service, and joined Gen. Polk at Demopolis, Ala., just on the eve of his departure for J. E. Johnstone's army in Georgia. There followed an active campaign on Johnstone's retreat from New Hope Church to Atlanta, where he was detached—more correctly was detached some time after the retreat from Atlanta, at "Rough and Ready." And then came service, chiefly detached, in making and mending roads and bridges, establishing ferries, etc., until the changes of fortune and special orders brought him to be surrendered by Gen. Dick Taylor, at Meriden, Miss., May 4th, 1865. He returned to New York June 3d, 1865; began the study of law; was graduated at Columbia College Law School, in May, 1867, and admitted to the bar. February 1st, 1869, he went into the partnership of Cronin & Smith, attorneys and counsellors at law, No. 176 Broadway, New York city. He was instructor in geodesy and acting professor in the Institute from 1871 to 1872.

Pierre-Jules Godeby, A. B., son of Pierre and Marie Therese (Duvwier) Godeby, was born at Manoir, department of Seine-Inférieure, France, April 24th, 1829. He was appointed professor of the French language and literature in the Institute in September, 1873, in which position he still continues. He received the honorary degree of Bachelierès lettres from the Universitè de France October 30th, 1847. Honorary member of the Rensselaer Society of Engineers. He married, May 4th, 1881, Mary Patrick, daughter of the late Jesse Patrick, of Troy, N. Y.

John Healey Kellom, A. M., was born in Washington county, N. Y., in 1818. He was graduated at Williams College in 1842. Taught one year at Whitingham, Vt.; three years near Milledgeville, Ga.; studied law one year in Auburn, N. Y.; taught the Troy Academy in Bradford county, Penn.; was two years principal of the Elbridge Academy, N. Y.; and four years of the East Bloomfield Academy. He removed to Omaha, Neb., in 1856, and was there principal of the high school for several years. He was instructor in English composition and rhetoric in the Institute from 1875 to 1877. He married Miss Henriette

Newell, of Syracuse, N. Y. One daughter, who married W. L. Adams, C. E., formerly director of the Institute.

WILLIAM WEEKS MORRILL, A. M., son of Josiah Robinson and Filinda (Weeks) Morrill, was born in Gilmanton, Belknap county, N. H., August 31st, 1851. He prepared for college at the New Hampton, (N. H.) Literary Institution, entering Dartmouth College in September, 1870, where he was graduated in 1874. He was principal of Norwich (Vt.) Academy from February, 1875, to June, 1876, and was head master of "Bede Hall," Cooperstown, N. Y., for the school year 1876–77. He was appointed instructor in the English language and literature in the Institute in September, 1877, and resigned in 1882. Meanwhile he had pursued the study of law, and was admitted to the bar of the state of New York in September, 1880, and since then has been engaged in the practice of law in Troy, N. Y.

He received the degree of A. M. from Dartmouth in 1877, and is a member of the Rensselaer Society of Engineers. He married, September 14th, 1876, Mira Marie Louise Lewis, daughter of William E. Lewis.

FRANK LEWIS NASON, A. B., son of Lewis Clark and Maria Julia (Stickles) Nason, was born at New London, Waupaca county, Wis., May 12, 1856. He prepared for college at Middlebury High School, Middlebury, Vt., and was graduated from Amherst College, Amherst, Mass., in June, 1882. He was appointed instructor in the English language, and assistant in mathematics, in the Institute in September, 1882. He spent a part of the winter of 1885 and 1886 at the Johns Hopkins University. He married, July 29, 1885, Thalia A. Painter, daughter of Dr. Henry W. Painter, of West Haven, Conn.

ASSISTANTS.

JAMES B. DUNGAN, M. D., was born in Canandaigua, N. Y., in 1812. He attended lectures at the Institute, and was appointed adjunct to the junior professor November 2d, 1830. He afterward studied medicine, and practiced in his native town for about three years, and then left, on June 15th, 1837, for the South. He located at Bayou Grossetete, about ten miles from

Bayou Plaquimine, on the Mississippi river, in the state of Louisiana, and practiced there his profession until he died, about 1870.

F. M. Howell, of Canandaigua, who furnished the above facts, writes that he has a letter, three pages of foolscap, sent him by Dr. Dungan from the South, dated September 27th, 1837, on which he paid one dollar postage.

GEORGE L. MOODY, of Boston, Mass., was a member of Division B. of the Institute, in 1850 and 1851, and of Division A, 1851 and 1852. He was also repeater or assistant in physics and mechanics in 1853 and 1854.

MATTHIEU DARMSTADT, Ph. D., of Darmstadt, Germany, studied in the Gymnasium, a private laboratory in his native town, and the laboratory of Fresenius, at Wiesbaden. After coming to this country he spent a short time in a drug store, and was afterward employed in the laboratory of Rutger's College. He was appointed assistant in chemistry at the Institute in the summer of 1866, and remained until 1868. He then returned to Germany, and entered the University at Göttingen, where he received the degree of Doctor of Philosophy. He afterward went into business, but has devoted considerable time to scientific investigation. He has written an article occasionally for some of the journals. Is married, and has a family.

N. B.—The records of other assistants and adjuncts, some of whom served for a year or more, and some for only a single term, all being graduates of the Institute, may be found with their respective classes.

BIOGRAPHICAL RECORD OF GRADUATES.

CLASS OF 1826.

STILMAN E. ARMS, A. B., (r. s.), M. D., was born at Canaan, Columbia county, N. Y., November 30th, 1803. He was a member of the first regular class of the Rensselaer Polytechnic Institute, his diploma bearing date April 26th, 1826. He spent between one and two years in giving lectures on the sciences, in western New York. In 1828-29 he attended medical lectures at Yale College, also the chemical lectures by Prof. Silliman. Having received his diploma from Yale, he entered upon the practice of medicine in 1830, in his native town, from whence he removed to Elizabeth, N. J., in 1833. He received a diploma from the Medical Society of New Jersey, with which association he was connected for forty years. He received the honorary degree of M. D. from the College of Medicine, Castleton, Vt. He relinquished the practice of medicine and made a specialty of surgical and mechanical dentistry. He married, November 8th, 1832, Rebecca, daughter of the late Dr. James English, of Freehold, N. J. Five children; four living. Died July 10th, 1877. "His remains rest in the cemetery beside the First Presbyterian church of Elizabeth, where for many years he was a ruling elder. He was a just man, and a true. On his death bed, in reviewing his life, he said that he had always endeavored to put religion first. He often spoke of the Rensselaer Polytechnic Institute, and of Professor Eaton, with great pleasure."

ABNER BENEDICT, A. B., (r. s.), Chatham, N. Y. After he was graduated he lectured on the experimental and demonstrative sciences, and afterward entered upon the practice of his profession, which he had studied before coming to the Institute, as attorney and counsellor at law, in New York city. Deceased.

ALBERT DANKER, A. B., (r. s.), son of Henry and Catherine (Smith) Danker, was born in Troy, Rensselaer county, N. Y., January 26th, 1802. He prepared with Hugh McManus and Sterling Armstrong, and entered the Rensselaer Polytechnic Institute in 1824, graduating in 1826 with the first class. He pursued his profession as civil engineer and surveyor in the city of Troy through life; was assistant in mathematics and lecturer on the natural sciences at the Rensselaer Polytechnic Institute; laid out the city of Cohoes, with Professor James Hall, of Albany, and also a large part of Troy; member of Troy Lyceum; He left a large number of manuscripts upon his favorite science of mathematics, which were never published. He married, October 14th, 1837, Asenath Harrison, daughter of Frederick Harrison. Three sons; one living, (Rev. Albert Danker, Ph. D., rector of Grace church, Watertown, N. Y.) He died in Troy, May 31st, 1868, in his sixty-seventh year.

HEZEKIAH HULBERT EATON, A. B., (r. s.) *See Junior Professors, page 134.*

TIMOTHY DWIGHT EATON, A. B. (r. s.), son of Amos and Sally (Cady) Eaton, was born at Catskill, Greene county, N. Y., December 16th, 1807. He was educated by his father, Professor Amos Eaton, and entered the Institute at its opening. Was appointed assistant in natural history in the Institute, and gave instruction to one or two classes. He was a young man of pleasant disposition, exemplary habits, and enthusiastic fondness for natural history. He died, of consumption, at Troy, N. Y., November 14th, 1828.

EBENEZER EMMONS, A. B. (r. s.), A. M., M. D. *See Junior Professors, page 136.*

ADDISON HULBERT, A. B., (r. s.), Chatham N. Y. He was a mechanical engineer, and little has been known of him since his graduation. He has been dead for many years.

PHILIP C. W. T. MCMANUS, A. B., (r. s.), son of William McManus, of Brunswick, N. Y. After he was graduated he studied law for a time, and afterward gave his attention to farming in his native town. He resided in Troy the later years of his life, and died in 1882.

WILLIAM SNOW PELTON, A. B., (r. s.), M. D., son of Platt and Phebe (Snow) Pelton, was born at Monticello, Sullivan county, N. Y., November 16th, 1807. He received the degree of A. B. from the Rensselaer School April 26th, 1826; received the diploma of physician and surgeon from Rutgers medical faculty of Geneva College, New York city, November 25th, 1827, and a certificate, March 1st, 1830, from the physicians and surgeons of the New York Hospital; elected a member of the Orange County Medical Society, December 16th, 1828; appointed surgeon's mate of the 185th regiment of infantry, by Gov. De Witt Clinton, November 27th, 1827; commissioned surgeon of the same regiment, by Lieut.-Gov. Throop, May 8th, 1830. He married, September 13th, 1837, Mary B. Tilden, daughter of Elam Tilden, of New Lebanon, N. Y. One child, (William Tilden Pelton, born July 20th, 1838, died July 8th, 1880.) Dr. Pelton died April 29th, 1839.

BENNET F. ROOT, A. B., (r. s.), M. D., Chatham, N. Y., son of Eleazer Root, was born in Canaan, Columbia county, N. Y., February 29th, 1804. He practiced medicine at his home in New York State until April, 1834, when he moved to Manchester, Washtenaw county, Michigan, where he practiced his profession very successfully up to the time of his death, January 16th, 1879, in his seventy-fifth year. He was one of the early settlers of Manchester and Washtenaw county. He graduated at the Berkshire (Mass.) Medical College in the class of 1832. He was twice elected president of the Washtenaw Medical Society. He married Dolly Ann Palmer, June 22d, 1837, who died October 20th, 1865, leaving five children.

CLASS OF 1827.

JONATHAN CHANDLER, M. D., A. B., (r. s.), was born in Alstead, N. H., in 1803. He had practiced medicine before coming to the Institute, and had received the degree of M. D. at the Medical School in Woodstock, Vt. After leaving the Institute he practiced medicine in Bennington, Vt., for five years, being for one year associated with Dr. Morgan. He died in Bennington, Vt., November 28th, 1835, aged thirty-two, and was buried in East Bennington cemetery. He was a man of marked ability, very genial and courteous in manner, careful of his dress, wear-

ing top boots, which he always removed before entering a house. The horses he drove were the best the state afforded. He was married, but left no children.

JOHN JACOB DAVEY, A. B. (r. s.) son of Jacob and Phebe (Dey) Davey, was born April 3d, 1811, in Fair Haven, Rutland county, Vermont. His father at an early day established iron works, rolling mills, etc., in Fair Haven, which were in operation until quite recently. With these works, John was connected after graduation for a time, and then traveled extensively in this country and Europe. He resided at one time at Malaga, Spain. Deceased.

FRANCIS GARDNER DREW, A. B. (r. s.), son of Thomas Collins and Elizabeth (Quinton) Drew, was born in Walpole, Cheshire county, N. H., February 22d, 1809. After leaving the Institute, he engaged in merchandising in his native village for a few years, and then retired to his farm, where he died February 28, 1872. Was postmaster for a time at Drewsville, in the town of Walpole. He married, June 25th, 1831, Clarinda A. Hartwell, daughter of John Hartwell, of Langdon, N. H.

ASA FITCH, Jr., A. B. (r. s.), M. D., was born in Salem, N. Y., February 24th, 1809. His preliminary education was obtained at the academies in Salem and Bennington, and having the medical profession in view, he preferred to a college course the round of practical instruction in the natural sciences given in the newly-established Rensselaer School, now the Rensselaer Polytechnic Institute, in Troy. He accordingly entered this institution in the spring of 1826, accompanying its first class of graduates in their scientific expedition to Lake Erie, and completing the course and graduating in June of the following year. He then pursued a course of medical studies in the office of Dr. Freeman, to whom his father had several years before resigned his ride, his cousin, G. N. Fitch, late United States Senator from Indiana, being his associate a part of the time. He attended two courses of lectures at the Vermont Academy of Medicine, in Castleton, and one at the Rutgers Medical College in the city of New York, graduating M. D., at the former institution December, 1829, and spending some months thereafter in the office of Dr. March, in Albany. In the capacity of

assistant of natural history, the following summer he joined the expedition of the Rensselaer School from New York city to Lake Erie, and from thence made a tour through the western states to Illinois and Missouri, returning the next year.

He then commenced the practice of medicine in the village of Fort Miller, where, November 15th, 1832, he married Elizabeth, daughter of John McNeil, of Stillwater. A more desirable opening for his business being presented in the village of Stillwater, he removed thither soon after his marriage. Whilst located in this place he took much interest and a leading part in all measures for the moral, the literary, and scientific advancement of the community, giving addresses and lectures on temperance and on scientific topics in this and the neighboring villages and hamlets, instructing a class of young ladies and gentlemen in botany, and actively participating in conducting a village lyceum for debates.

His father becoming, by advanced years, incapacitated for business, caused his return to Salem in the spring of 1838, to take charge of the paternal estate. He thereupon became occupied principally in agricultural pursuits, but instructed some medical students and classes in botany in the Granville and Salem Academies, and in 1844 and 1845 he served in the newly-created office of town superintendent of schools. An act to promote agriculture, passed by the State Legislature in 1841, led to the organization of the County Agricultural Society, in which he actively participated, and was chosen secretary of the society, and the drafting of its rules and regulations and the general oversight and management of its business affairs devolved upon him. The society soon acquired the public confidence, and grew into eminent popularity. He continued in this position five years, and in 1848 was elected president of the society.

The State Agricultural Society, with the design of obtaining a complete agricultural survey of the State, commenced this work by engaging Dr. Fitch to make a survey of Washington county. He was occupied with this survey nearly three years, the results being published in the transactions of the State Society for the years 1848–49, comprising some three hundred pages of those volumes. Among the topics on which he was required to report was the date of the first settlement of the

several towns, the places from whence the settlers came, etc. To obtain this information he visited the aged people in the several parts of the county, from whose recitals he gathered an unexpected amount of interesting matter relating to the early history of the county, which was on the point of passing into oblivion, and this historical portion of his report attracted much general notice, and led to his election as a corresponding member of the New York, and honorary member of the New Jersey Historical societies.

Through life, insects had been a leading and favorite study with him, and, being solicited by Dr. Emmons to contribute entomological articles to his newly commenced *American Quarterly Journal of Agriculture and Science*, he, in 1845, furnished to the second number of that periodical, a communication of thirteen pages upon "Insects of the genus Cecidomyia," describing therein a new species of willow gall-fly, illustrated with figures of the insect in the different stages of its growth and the excrescence which it produces upon the willow. This was followed six months after by an essay of thirty pages upon the wheat-midge, and in 1846 an essay of sixty-three pages upon the Hessian fly, which was subsequently revised and republished in the Transactions of the State Agricultural Society. In 1847, an article of 12 pages on the "Winter Insects of Eastern New York," describing eight new species, appeared in Dr. Emmons' journal, and in the Transactions of the State Agricultural Society for this year he gave an account of the currant worm and the moth by which it was produced. This interesting new species, beautifully illustrated with a finely engraved colored plate, was widely noticed in the foreign scientific journals, whereby the author became favorably known to entomologists the world over. At this period he was employed for a time in collecting and naming the insects of the State, for the State cabinet of natural history, and in the report of the Regents of the University for 1851, he gave a descriptive catalogue of the New York insects of the order Homoptera, in which a new species is named and described.

The Legislature having made an appropriation for his employment as State entomologist, in 1854, he commenced an examination of the insects of the State, particularly of those that are injurious, reporting his investigations each year to the State

Agricultural Society, for publication in its transactions. He engaged in this work *con amore*, dropping the town offices and other minor positions to which he had been giving a part of his time, and wholly withdrawing from every other employment, he devoted himself assiduously to this work. He aimed to make these annual reports scientifically accurate, and at the same time so divested of technical language as to be perfectly intelligible and fully comprehensible by common readers. In addition to their insertion in the "Agricultural Transactions," they were issued separately, so often as they formed a volume of suitable size for binding. Year after year, as these reports appeared, they received marked notice and commendation, both in this country and in foreign lands, several of the scientific periodicals giving extended accounts of their contents. Thirteen of these annual reports were issued, the first nine of them forming three bound volumes, and the last four having appeared only in the "Agricultural Transactions." He was elected a member of the entomological society of France, of Russia, and other scientific societies at home and abroad, and the Imperial and Central Agricultural Society of France bestowed a gold medal upon him as a testimonial of its appreciation of the valuable services he was rendering to science.

Dr. Fitch's last years were spent in preparing a history of the Fitch family, which he did not live to complete. He was a thoroughly honest, upright man in all his dealings with his fellow men, and never feared or failed to espouse the cause which commended itself to his better judgment. He died at Salem, N. Y., Tuesday, April 8th, 1878, leaving a wife, one son and three daughters.

GEORGE FIRMAN HORTON, A. B., (r. s.), M. D., son of John and Deborah (Terry) Horton, was born at Terrytown, Bradford county, Penn., January 2d, 1806. He received his early education in the country schools, and afterwards engaged in teaching. In 1824–25 he attended the Academy in Wilkesbarre, Penn., entered the Institute in 1826, and was graduated in 1827. In the same year he entered as a student of medicine the office of Dr. S. Hayden, one of the most distinguished physicians of Luzerne county, Penn. In 1828–29 he lectured in the medical department of Rutgers College, in New York

city. In 1829 he commenced the practice of medicine in Terrytown, and here he has continued to reside and practice his profession from that time until the present. He received the honorary degree of M. D. from the Geneva Medical College, and was a prominent and active member of the Bradford county Medical Society; a member of the Medical Society of the State of Pennsylvania, and its presiding officer in 1862, a permanent member of the American Medical Association, and honorary member of several medical organizations. In 1858 he wrote the report of the Bradford county Medical Society on the geology of the county, which, accompanied by a map, was published in the "Transactions of the Medical Society of Pennsylvania" for that year. He was postmaster at Terrytown from 1830 to 1850; auditor of Bradford county, 1836–37–38; treasurer and town clerk of his native town for ten years; surgeon of the Fifteenth regiment, Pennsylvania militia, from 1828 to 1835; in 1872 was elected a delegate from the Fourteenth Senatorial district to the convention for revising the constitution of Pennsylvania. In 1885 he published "Chronicles of the Descendants of Barnabas Horton, of Southold, Suffolk county, N. Y., 1640." He married, June 4th, 1832, Abigail Terry, daughter of William Terry. Eight children; four living.

Samuel Clinton Jackson, A. B. (r. s.), was from Florida, N. Y. He was an agriculturist, and went to Galesburg, Ill., where he still resides.

Rev. John Calvin Keeney, A. B., (r. s.), was from Sparta, Ga. He had studied theology, and been settled as a clergyman before coming to the Institute. After graduation, he was employed as professor and lectured on the experimental and demonstrative sciences in the Sparta Female Seminary, and afterwards occupied a similar position in a Female Seminary in South Carolina.

Orlin Oatman, A. B. (r. s.), son of Eli and Mary (Simmons) Oatman, was born at Middletown, Rutland county, Vermont, January 24th, 1805. He attended school in Castleton, Vt., and entered the Institute in 1826, and was for a term assistant; appointed adjunct to the senior professor, February 20th, 1829. He studied medicine, and received the degree of M. D., at the Medical School in Castleton, Vermont. He died in Milwaukee,

Wis., in 1849. He married, December 26th, 1836, Lucy Ann Williams, of Rochester, N. Y.

EDWARD SANDFORD, A. B. (r. s.), son of Jared and Sally Radley (Halsey) Sandford, was born at Ovid, Seneca county, N. Y., September 22d, 1809. He prepared at the Academy at Aurora, N. Y., Rev. Salmon Strong, principal, and entered the Institute. In 1830 he commenced the study of law, in the office of his brother, and remained with him until the spring of 1833, when he went to the city of New York. He was there admitted to the bar, and continued in the practice of his profession until his death. He was lost at sea, in the steamship Arctic, on September 27th, 1854. His whole life was devoted to his profession, and his record is to be found in the "Law Reports of the State of New York, 1833 to 1854." He married, May 10th, 1837, Janet Saijeant, daughter of Thomas Saijeant, of New York city. Six children.

CHARLES L. WESTON, A. B. (r. s.), Sandy Hill, N. Y. After graduation he studied law, was admitted to the bar, and was for many years attorney and counsellor at law in Burlington, N. J. He then removed to Davenport, Iowa, where he still continues to practice.

CLASS OF 1828.

HIRAM ARNOLD, A. B. (r. s.), son of Gen. Benedict and Mary (Bovee) Arnold, was born at Amsterdam, Montgomery county, N. Y., in 1807. He prepared at the Amsterdam Academy, and entered the Institute in 1826. For several years after graduating he was clerk in his father's store. In 1834 he went to Albany, and was connected with the Swiftsure Line Transportation Company, remaining in that business until his death, in Albany, N. Y., in the spring of 1859. He was a noted member of the Masonic Fraternity, having gone through all the degrees known to that order.

GARDNER BULLARD, A. B., (r. s.), son of John and Lucy (Buxton) Bullard, was born at Shrewsbury, Rutland county, Vt., September 27th, 1808. He prepared in the district schools, and at home, and entered the Institute in 1827. He was a farmer, but

for several years was engaged in manufacturing. He married Diana Kinsman. Six children; five living. He died September 5th, 1878.

FAY EDGERTON, A. B. (r. s.), son of Uriah and Lydia (Fay) Edgerton, was born at Bennington, Bennington county, Vt., July 9th, 1803. He prepared in the public schools of his native town, and entered the Institute in 1825, remaining one year, after which he became adjunct to the senior professor, being appointed in February, 1828. He remained in this capacity until the fall of 1828, when he went to Utica, N. Y., as professor of chemistry and natural sciences in the Utica Gymnasium. He attended medical lectures in Pittsfield, Mass. At the time of his death he was engaged in delivering a course of medical lectures at Woodstock, Vt. His connection with the Academy at Utica was retained until his death, April 18th, 1832. As a teacher he possessed the faculty of securing not only the confidence, but also the love, of every pupil. He was ardent in the pursuit of knowledge, and had attained rare excellence in the natural sciences.

THOMAS EMORY, JR., A. B. (r. s.), East Shore, Md., was a student of civil engineering and agriculture. After leaving the Institute, paid particular attention to the latter subject. Has not been heard from for many years.

WILLIAM GILMORE HENRY, A. B. (r. s.), son of William and Anna (Brownson) Henry, was born at Bennington, Bennington county, Vt., September 12th, 1807. His early days were spent on his father's farm, and in his store at Henry's Corners, Bennington. Prepared at Bennington Academy and Seminary; entered the Institute at the beginning of the fall term of 1827, and graduated in the summer of 1828; taught school during the winter of 1827–28 in his native town. His occupation has been that of a business man; in Bennington a farmer and a manufacturer until 1836, when he removed to Grand Rapids, Mich., where he resided thirty-one years, as merchant, justice of the peace, and druggist. In 1867 he removed to Detroit, where he has since resided. January 9th, 1833, he married Huldana Squier, daughter of Wait Squier, of New Haven, Vt., who died May 8th, 1880. Five children.

THOMAS C. RIPLEY, A. B. (r. s.), son of Abner and Anna (Cornell) Ripley, was born in Easton, Washington county, N. Y., January 2d, 1807. He attended district school in the winter and worked on the farm in the summer; taught district school two winters; entered the Institute in 1827. He commenced the practice of law in 1833, at Little Falls, Herkimer county, N. Y., and removed to Schaghticoke, Rensselaer county, N. Y., in 1836, where he continued in the practice of his profession until 1856, when he removed to Saginaw, Mich., and engaged in farming. He held the unexpired term of R. P. Herrick in Congress from the Rensselaer county district in 1847, and held a term in the House of Representatives of the state of Michigan to which he was elected in 1872. He married, November 14th, 1836, Ruth A. Richards, daughter of Dr. William Richards, of White Creek, Washington county, N. Y. Two children. P. O. address, Saginaw, Mich.

CLASS OF 1829.

JOHN MANNING BARROWS, A. B. (r. s.), A. M., son of John and Bethia (Anthony) Barrows, was born in Troy, Rensselaer county, N. Y., October 17th, 1807. He prepared at the Lansingburgh Academy, and entered the Institute in 1825. In 1826 he was appointed adjunct professor to the senior professorship, and taught and studied three years, graduating in 1829. He was offered and accepted free tuition by Patroon Van Rensselaer, with the understanding that he was to teach the natural sciences three years after graduation. In 1829 he went to Wrightsboro, Ga., to introduce the Natural Sciences into Winsor Hill School, and remained one year. He returned to the Institute and taught a short time; went to Onondaga Academy, and taught one year; then to Geneseo, N. Y. After fulfilling his three years' engagement he taught in Chillicothe, Ohio, and in 1835 went to Oberlin, and studied theology. He graduated, and then preached at Fort Ann, N. Y., and Perrysburgh, Ohio; also preached and taught in several places in Michigan. In 1860 he was called to the professorship of natural science in Olivet College, Michigan; taught ten years, then resigned and went to Kansas for his health; returned to Olivet after four years; received the honorary degree of A. M. from Olivet College. He married, August

13th, 1838, Catherine Payne Moore, daughter of Charles Moore, of Northumberland, N. Y. Five children; four living.

CYRUS BRYANT, A. B. (r. s.), son of Peter and Sarah (Snell) Bryant, was born at Cummington, Hampshire county, Mass., July 12th, 1798. Attended the Hadley Academy, under the tuition of Dan Huntington, D. D., father of the present Bishop Huntington, and entered the Institute in August, 1829. Lectured on natural sciences at Northampton, Mass.; also at Princeton, Ill., as well as several other places in Massachusetts and Illinois; was circuit clerk of Bureau county, Illinois, and master in chancery, same county and state. He married, May 13th, 1834, Julia Everett, of Cummington, Mass., daughter of James Everett. Six children. Died at Princeton, Ill.

JOSEPH B. CLARKE, A. B. (r. s.), entered the Institute in 1829, and graduated the same year. He was then appointed professor of natural sciences in the Rensselaer branch school at Cortland, Cortland county, N, Y., where he taught for some time. Deceased.

DANIEL O. COMSTOCK, A. B., (r. s.), Lockport, N. Y. Horticulturist. After leaving the institution he lectured more or less on natural sciences; was also a horticulturist, and dealt somewhat in real estate. He read law for a time in the office of Messrs. Ransom and Holmes. His health failing, he went to Monroe, Mich., to visit temporarily his brother Stephen, and there died, of consumption, about the year 1834. Unmarried.

MINER GOLD, A. B. (r. s.), A. M., Pelham, Mass., son of Joseph and Patty (Edson) Gold, was born in Stafford, Conn., October 13th, 1805; prepared for college at the Amherst Academy, under Professor Ebenezer Snell. He entered Amherst College in 1827, where he remained one year, and then entered the Institute, graduating October 28th, 1829. Was for some time a teacher and lecturer in South Carolina and Massachusetts, and received the honorary degree of A. M. from Amherst College. He married Livia Conkey, of Pelham, Mass., October 10th, 1853. Seven children. P. O. address, Enfield, Mass.

JAMES S. HORTON, A. B. (r. s.), M. D., Orange county, N. Y., lectured on natural sciences and continued his medical studies.

He practiced medicine in Goshen, N. Y., until 1848, when he moved to Muscatine, Iowa, and died there in March, 1879.

DOUGLASS HOUGHTON, A. B., (r. s.), M. D., was born in Troy, N. Y., September 21, 1809. At an early age he accompanied his father's family to Fredonia, N. Y. In this quiet village, and during the usually thoughtless years of childhood, he laid the foundation of his scientific reputation. A little hermitage erected by himself in the shade and seclusion of his father's orchard, for a place of quiet study, still remains, a witness to the self-directed character of his acquirements. Here he commenced his researches into the laws of nature. Nor was the mere acquisition of knowledge all that attracted his mind; he at once turned it to practical account. At this period he commenced experiments in the manufacture of percussion powder, which had then been recently invented, and he had actually proceeded some way in the erection and management of a manufactory for the purpose, when an unlucky explosion took place, by which the whole works were blown up, and young Douglass along with them. He chanced to alight on a neighboring shed, and when returned to his senses, found his clothes in a blaze. He had the presence of mind to plunge instantly into a pond, and thus prevented further injury, but he bore evidences of the accident ever afterwards. With all this love of studious application, Douglass was the "head and front" of all the fun-making exploits of the village boys, of whom he was the favorite. Active and persevering, possessed of great natural wit and shrewdness, he was the acknowledged leader in boyish enterprises. Thus passed his boyhood. Before its ordinary period had elapsed, a career of honorable distinction opened to him. His talents and studious habits led to his selection from the county of Chautauqua, to be educated at the Rensselaer School of Troy, at that time under the charge of Professor Amos Eaton. Here he graduated, and received his diploma as Bachelor of Arts, in October, 1829. He remained as an assistant, and in February of the year following received from Professor Eaton the appointment of adjunct to the junior professor in the branches of chemistry and natural history. Professor Eaton stated to the board that this arrangement was temporary, for he was sure Mr. Houghton would receive a higher appointment as

soon as the proper authorities could act. In November, 1830, some friends of science in Detroit applied to Professor Eaton to recommend them a person qualified to deliver a course of public lectures on chemistry, geology, mineralogy and natural philosophy. Then Hon. Lucius Lyon was deputed to wait in person upon the professor. Having heard the request, Professor Eaton opened the door of the laboratory, where young Houghton was engaged, and calling him by his familiar name of Douglass, presented him to Mr. Lyon as the person he required. Small and extremely youthful in appearance, it was some time before Mr. Lyon could be satisfied that the professor was in earnest in his recommendation. But these doubts were speedily removed, and well did the young candidate justify the opinion of his instructor and friend. Still retaining his professorship, he gladly obtained leave of absence, and immediately departed for Detroit. With his lectures there, commenced his career in Michigan. It is no small testimony to his merit, that at a gay military post, devoted to amusement, and at an age when few have acquired the art of imparting as well as receiving instruction, he succeeded in captivating all hearts to his favorite pursuits. His lectures soon became the preferred resort, even of those who had been accustomed to look for enjoyment only in balls and pleasure parties. Having pursued the study of medicine, Mr. Houghton was, in the spring of 1831, admitted to practice, by the Medical Society of Chautauqua county. At this period he also received the appointment of physician and botanist to the expedition to the source of the Mississippi, organized under the direction of Henry R. Schoolcraft, Esq., and his able report on the botany of that remote country not only showed an extensive acquaintance with that science, but his researches did much to extend our knowledge of the flora of the northwest, as well as to establish his own reputation.

From 1832 to 1837 Dr. Houghton practiced as a physician and surgeon at Detroit. This period included the visitation of the cholera, which raged at that place with more than its wonted severity. That event will never be forgotten by the survivors; nor will they forget the labors and devotion of Dr. Houghton. He was to the sick a ministering angel, prompt at a moment's notice, instant and active in his remedies, cheerful and obliging,

as well to those from whom he expected no pay as to the opulent.

In February, 1837, Dr. Houghton projected the geological survey of Michigan, and received the appointment of geologist to that state, which, but recently admitted into the Union, and as yet sparsely populated, was one of the foremost in public enterprises. The season of 1840 was passed by the geological corps in an exploration of the southern coast of Lake Superior, and the general results were reported by Dr. Houghton to the Legislature the winter following. Dr. Houghton's labors in developing the geology of Michigan, a state at the time in great part a wilderness, were necessarily arduous, and they were unremitting. As the death of Dr. Houghton prevented his making his final report upon the geology of Michigan, it is due to his memory to state, that the amount of materials collected, in the form of notes, plots, geological, mineralogical, botanical and zoological specimens and engravings, and which now enrich the cabinets of Michigan, probably surpass those obtained by any of the other states, New York excepted; and it is almost needless to say that the results are second in interest to none.

In 1838, Dr. Houghton received the appointment of professor of geology, mineralogy and chemistry in the University of Michigan, which he continued to fill till the time of his death. The institution was then in its infancy, and Professor Houghton's labors being required elsewhere, he was enabled to devote but little time to the duties of the professorship. His influence was, however, of great service to the rising institution.

The ambition of Dr. Houghton, and his popularity in the state led him to attempt other fields of distinction. He knew how the political wires were worked, and though he permitted himself to enter that difficult and harassing arena only in the latter period of his life, he yet came sufficiently "before the public" to evince that he possessed in a high degree the talents which in this country are supposed to be necessary to the statesman. As mayor of the city of Detroit he acted independent of party or clique, and was at once energetic, keen-sighted and assiduous. Of his other political connections, which were cut short by his death, we will only say that it was the desire and expectation of his numerous friends to see the gubernatorial chair of the state filled by one who would so well have honored that station.

Dr. Houghton was married in 1833 to Miss Stevens, of Fredonia, and his death bereft also two children. The circumstances attending his melancholy end are characteristic both of his nobleness and his intrepidity. He was engaged upon his new survey of Lake Superior. Accustomed to steer his own boat, fearless in his knowledge of the waves and of the coast, and anxious to arrive at a particular destination, he paid too little heed to the omens that warned his Canadian voyagers of the storm; or rather, he trusted, as he had done a hundred times before under circumstances of greater apparent peril, to his own judgment and skill, to reach the port before the danger should be imminent. When the storm commenced his men proposed going ashore. Dr. Houghton encouraged them to proceed, saying, "We are not far from Eagle River; [their destination] pull away, my boys; pull away, we shall soon be there; pull hard." When in the increasing violence of the gale, the frail boat encountered the surf and was capsized, the geologist was raised from the water by his trusty voyageur, Peter, and told to cling to the keel. He answered, "Never mind me, Peter, go ashore if you can; I will go ashore well enough." Another sea struck the boat, throwing it completely over endwise, and probably occasioning instant strangulation. Thus ended the life of Dr. Houghton, on the night of the 13th of October, 1845, at the age of thirty-six years.

Lysander H. Kingman, A. B. (r. s.) After graduation, he devoted most of his time to agricultural pursuits; but for many years was chief justice of Norfolk county court, Va., until ill-health forced him to retire. Ou his death, resolutions were passed to the effect that he had always discharged his duties with singular ability, intelligence and integrity, and that in him they had always found a faithful, efficient and impartial officer. He died February 23d, 1868, after a protracted illness of nearly three years, which he bore with great meekness and resignation.

Jeremiah B. Metcalf, A. B. (r. s.) After graduation, was professor of natural sciences in an academy in Ontario county. Much later, he went to the Sandwich Islands, and there practiced his profession of civil engineer. Deceased.

ALANSON JERMAIN PRIME, A. B. (r. s.), M. D., son of Nathaniel Scudder and Julia (Jermain) Prime, was born in Southtown, Suffolk county, N. Y., March 12th, 1811. Prepared by his father, who was an eminent scholar, he graduated from Williams College in 1829, and the same year entered the Institute. Lectured on natural science in the academy at Sing Sing, 1829; practiced as physician at Sing Sing, N. Y., 1832–34; at Schenectady, N. Y., 1834–36; Marshall and Grand Rapids, Mich., 1836–39; Newburgh, N. Y., 1840–47; Plattekill, Ulster county, N. Y., 1847–48; White Plains, Westchester county, N. Y., 1848–64. He engaged in teaching from 1840 to 1847. Received the honorary degree of M. D. from the College of Physicians and Surgeons, New York city, and from the New York University. Wrote works on science, also poetry and fiction; his contributions were published in the New York State Natural History, Columbia Magazine, Parlor Magazine, Harper's Magazine, &c. Married, September 1st, 1836, Ruth Havens Higbie, daughter of Benjamin Higbie, of Troy, N. Y. Six children, five living. He died April 3d, 1864.

JOHN L. RIDDELL, A. B. (r. s.), M. D., Preston, N. Y., while connected with the Institute, was also a student of medicine, and after his graduation received the degree of M. D. He lectured on the natural sciences in the High School, Ogdensburgh, N. Y., in 1831; afterward in some institution in Ohio, and in 1833 and later was connected with the United States mint in New Orleans, La. It is stated he afterward settled there as a physician. Deceased.

CLASS OF 1830.

RUFUS B. BEMENT, A. B. (r. s.), son of Samuel and Anna Bement, was born in Ashfield, Mass. After graduation he spent some time in lecturing upon scientific subjects. He prepared for the ministry, and was connected with Congregational and Presbyterian churches in Michigan, Ohio and other parts of the West. He was married. He died suddenly November, 1884, just as he was starting from Chicago to spend his Thanksgiving with friends in his native State.

THEODORE WELLS DECKER, A. B. (r. s.), son of John and Christina (Wells) Decker, was born in Bloomingdale, New Hamptonburgh, Orange county, N. Y., November 16th, 1811. Prepared at Blooming Grove Academy, and entered the Institute September, 1829, graduating in 1830. He commenced the study of medicine, but failing health compelled him to discontinue it. In 1833–34 he became a partner with his father, and was engaged in farming and in woolen mills. He died April 1st, 1844.

ALBERT R. FOX, A. B., (r. s.), son of Isaac B. and Eunice G. Fox, was born in Nassau, Rensselaer county, N. Y., February 18th, 1810. He was prepared at the Albany Academy and entered the Institute in 1829. Engaged in merchandise and and farming in 1831. In manufacture of window glass in 1836; for twenty to twenty-five years at Sandlake, Rensselaer county, N. Y., at Berkshire, Berkshire county, Mass., and Durhamville, Onedia county, N. Y. President of projected Albany, Sandlake and Stephentown Railroad. State senator in 1848–49. Married Mary A. Gregory, daughter of A. V. P. Gregory, of Sandlake, N. Y., who died February 20th, 1869; three children. P. O. address, Sandlake, N. Y.

LEMUEL GREGORY OLMSTEAD, A. B. (r. s.), A. M. LL. D., was born at Maltaville, Saratoga county, N. Y., July 5th, 1808. He graduated at the Rensselaer School in 1830. In 1831 was a lecturer on chemistry and natural history in Dickinson College, Carlisle, Pa. Was a student in Union College from 1832 to 1834, where he graduated in 1834, with the degree of A. B., and received the degree of A. M. in 1837. Was a student in Princeton Theological Seminary in 1834–35, at Western Theological Seminary from 1836 to 1838. Married Sarah Humphreys Marvin in 1838, who died in 1843, leaving a daughter. Was an ordained minister from 1830 to 1848. Traveled in Europe from 1848 to 1852. Was principal of Erie Academy 1858–59; chaplain in the army from 1862 to 1865. Received degree of LL. D. from Hanover College, Indiana, in 1865. Traveled in Europe 1867–68. Clergyman, archæologist and farmer. He died at his home near Fort Edward, N. Y., in 1882.

GEORGE KELLOGG OSBORN, A. B. (r. s.), son of William and Jemima (Kellogg) Osborn, was born in New York city July 17th, 1815, and entered the Institute in 1829. He practiced law in New York city until his death. Married June 11th, 1838, Harriet C. Chamberlin; two children. He died in Brooklyn, March 8th, 1843.

SAMUEL JARVIS PIKE, son of Don Harmon and Jerusha (Hartwell) Pike, was born in New Marlborough, Berkshire county, Mass., October 8th, 1813. He attended the country school at Nassau, N. Y., where his parents resided, and in the spring of 1828 entered the Institute. After spending two years upon the government survey of Iowa, he entered the Cleveland Medical College, Cleveland, Ohio, where he graduated about the year 1848. Having been seized with consumption, he was never able to enter upon the practice of his profession, and died April 14th, 1850. He married, in 1848, Maria Brown.

MERRITT PLATT, A. B. (r. s.), Milford, Conn., late superintendent of the Milford High School. He was also a lecturer on the natural sciences. Deceased.

RUSH SHERRILL, A. B. (r. s.), was born in Hyde Park, Dutchess county, N. Y., June 23d, 1812. He entered the Institute, and graduated with the class of 1830. He followed various occupations until 1842, when he went into the mercantile business, and followed it for about twenty years, when he retired. In 1864, being in Dutchess county, he took an active part in getting the Dutchess & Columbia and Poughkeepsie & Eastern railroads started. P. O. address, 143 West Twentieth street, New York city.

PAUL EUGENE STEVENSON, A. B. (r. s.), A. M. *See Junior Professors, page 134.*

JOSEPH THOMAS, A. B. (r. s.), A. M., M. D., LL. D., son of David and Hannah (Jacobs) Thomas, was born in Ledyard (formerly Scipio), Cayuga county, N. Y., September 23d, 1811. He entered the Institute in 1830 and Yale College in 1832, but left on account of illness. Graduated (in medicine) at the University of Pennsylvania in 1837. Assisted in the preparation

of a pronouncing gazetteer, published in Philadelphia in 1845. He received the honorary degree of A. M. from Yale College in 1854; LL. D. from University of Pennsylvania and from Princeton College in 1873. Published "Pronouncing Gazetteer of the World" in Philadelphia in 1854, "Universal Pronouncing Dictionary of Biography and Mythology" in Philadelphia in 1871. Professor of English literature in Swarthmore College from 1873 to the present time. P. O. address, 1312 Filbert street, Philadelphia, Penn.

WILLIAM WILKINSON, A. B. (r. s.) son of Robert and Phebe (Oakley) Wilkinson, was born at Poughkeepsie, Dutchess county, N. Y., May 7th, 1810. Prepared at Whitesboro Academy, and entered the Institute in 1830. In 1839, began the practice of law at Poughkeepsie, N. Y., and continued to practice there until his death, December 12th, 1864. Married, September 1st, 1842, Mary E. Trowbridge, daughter of Stephen B. Trowbridge. Five children.

CLASS OF 1831.

JAMES CURTIS BOOTH, Ph. D., LL. D., son of George and Ann (Bolton) Booth, was born at Philadelphia, Penn., July 28th, 1810. Entered the Rensselaer School in 1831, two years after graduation at the University of Pennsylvania, Philadelphia. From the Rensselaer School he went to Flushing, L. I., and gave an introductory course in chemistry in 1832–33. Went to Germany in December, 1833, studied a year in Wöhler's private laboratory in Hesse Cassel, then a year with Gustav Magnus in Berlin, and opened a laboratory for instruction in analytical chemistry in Philadelphia in 1836, which establishment is continued to this date, under the name of Booth, Garrett & Blair. He was assistant in the first geological survey of Pennsylvania; then surveyed Delaware during 1837–38. Lectured for nine consecutive winters, in the Franklin Institute, Philadelphia, to 1845, making three similar courses of three winters each, on applied chemistry, going through the whole range of the useful chemical arts. He received the degree of LL. D. from Lewisburg college, Penn., and Ph. D. from the Institute in 1884. Member of the American Philosophical Society, and Academy of Natural Science, Philadelphia. Published the

Encyclopedia of Chemistry, 1845–50; Report on Progress of Chemical Arts, Smithsonian Institute. He has been in charge of the melting and refining of metals at the United States mint in Philadelphia for many years. P. O. address, U. S. Mint, Philadelphia, Penn.

JAMES C. COBB, A. B. (r. s.), M. D., was born in Russia, N. Y., August 12th, 1807. Entered the Institute in 1830, and graduated in 1831. He went South in 1835, and commenced the practice of medicine in South Carolina. In 1840 he returned to the North, and remained until 1849, when he went to San Jose, Cal., and resumed practice. In 1854, while on a visit to the East, he had a severe attack of pleurisy, from the effects of which he never entirely recovered, and which finally obliged him to relinquish all practice in 1861. After this time he was one of the Fund Commissioners of San Jose, and in 1868 he was chosen President of the San Jose Saving Bank, which office he resigned in 1871. He died on the 5th of April, 1872. Married October 10th, 1841, and again January 20th, 1859. Five children; four living.

EDWARD DEVOL, A. B., (r. s.), was born in the city of Troy, October 11th, 1811. He was married to Miss Maria Williams, the youngest daughter of Jacob and Mary Williams, of Schaghticoke, March 14th, 1836. His early death from typhoid fever occurred in Troy, October 6th, 1837, aged twenty-five years, eleven months and twenty-four days. "He was buried in the cemetery at Albia, in the city of Troy, with military and masonic honors. [See monument.] Edward Devol was the only child of Stephen and Katharine Devol. He left an only child, now living, Miss Sarah Devol, who inherits his characteristics in a remarkable degree.

Edward Devol attended and taught common school before he entered the Rensselaer School, as it was then called. After his graduation he engaged in merchandise in crockery and glass ware in Troy. He was above medium size, and of commanding and pleasing presence. He was remarkably proficient in science and literature, and exceptionally apt as a conversationalist and reader—a born dramatist in tragedy, and especially so in comedy. His witticism were sarcastic, and of the side-splitting kind, but he left all the laughing to the crowd. His early death is one

of the unsolved problems. A broken column is a fitting monument over such a grave."

AUGUSTUS G. HILL, A. B., (r. s.), was from Worcester, N. Y. Nothing can be learned of him, except that for a time after graduation he taught and lectured upon the natural sciences.

ABRAM SAGER, A. B., (r. s.), A. M., M. D., son of William and Hannah (Brouck) Sager, was born at Bethlehem, Albany county, N. Y., December 22, 1810. His father was a farmer of remote German ancestry, who settled in the Empire State at an early day. Dr. Sager entered the Institute in 1829, where he remained for two years as pupil and assistant, and graduated in 1831; here he was under the instruction of Prof. Eaton in botany and zoology, and thus acquired a taste for those studies which were a specialty with him all his life, and in which he acquired a considerable reputation. Subsequent to the period mentioned above, he pursued his studies in Albany and New Haven, Conn., under the instruction and supervision of the late Professors March and Ives; he attended lectures at the Albany Medical School, and at Castleton, Vt., and graduated at the latter institution in April, 1835; he settled first at Detroit, Mich., removed from there to Jackson, Mich., and finally to Ann Arbor, where he remained for over thirty years; in 1837 he was appointed chief in charge of the botanical and zoological departments of the Michigan state geological survey; by November of that year he had made a considerable collection of specimens in zoology; he made a report in 1838, accompanied by a catalogue of what he had collected, and the specimens mentioned in this are those which laid the foundation of the present geological collection in the museum of the University of Michigan; he made valuable collections also in botany; the Sager herbarium, now in the University Museum, continues 1,300 species and 12,000 specimens; these were collected partly in the Western States, but chiefly in New England; there is also a valuable collection in the Medical Museum of the University, prepared by Professor Sager, illustrating comparative craniology, neurology and embryology of the vertebrata; this work, in connection with the geological survey, closed in 1840; from 1842 to 1845 he was professor of botany and zoology in Michigan University; in 1848 he

was appointed to the chair of Theory and Practice of Medicine, and in 1850 to that of Obstetrics and Diseases of Women and Children in the medical department of the University of Michigan; for several years he held the position of Dean of the medical faculty, and held that position even after he had ceased active duties in the work of instruction; his failing health caused him to resign his position, and he spent the winters in Florida.

Dr. Sager was a member of the American Association for the Advancement of Science, of the Academy of Science of Chicago, of the Academy of Natural Science of Philadelphia, of the Academy of Science of New Orleans, of the American Medical Association, of the New York State Medical Society, of the Obstetrical Society of Philadelphia, and of the Michigan State Medical Society. He was the author of a variety of papers in the "Rensselaer Review of Medicine" and "Detroit Review of Medicine," besides papers in the "American Journal of Science" and in the "Proceedings of the Academy of Natural Sciences of Philadelphia. In 1876, at the annual meeting of the Michigan State Medical Society, Dr. Sager was unanimously elected its president under circumstances which showed the esteem in which he was held by the profession of the state. For many years he was president of the Board of Education in Ann Arbor, and resigned because of ill health. Dr. Sager died at Ann Arbor, Mich, on the 6th of August, 1877, in the sixty-sixth year of his age.

ABEL STORRS, A. B., (r. s.), son of Constant and Elvira (Neff) Storrs, was born in Lebanon, Grafton county, N. H., May 15th, 1807. He prepared at Kimball Union Academy, Meriden, N. H., and entered the Institute in 1831. He was assistant in the Institute during the summer term of 1832. Since then he has been for most of the time an agriculturist. He married, September 9th, 1839, Sarah Storrs, daughter of Constant Storrs, who died June 2d, 1840; married, May 12th, 1851, Eliza Charlotte Hoyt, daughter of Otis Hoyt. Three children. P. O. address, Lebanon, Grafton county, N. H.

CLASS OF 1832.

WILLIAM H. BOYD, A. B., (r. s.), (Ovid, N. Y.), son of William A. and Rutha (Seymour) Boyd, was born in Hartwick, Otsego county, N. Y., October 6th, 1811. Attended Ovid Academy, Sen-

eca county, N. Y., from 1826 to 1831, when he entered the Institute. Was engaged in general merchandise from 1836 to 1846; hardware and iron, 1846 to 1857; in Monroe, Mich., lubricating oils; in New York city, 1868 to 1871; banking and produce trade from 1872 to the present time; was head of the firm of W. H. Boyd & Co., in New York city, 1868 and 1869, and one of the first to export to England, Germany and Russia lubricating oils of West Virginia; was also connected with the First National Bank of Monroe, Mich., at one time president, also director and vice president; superintendent of Presbyterian church Sunday school for forty years; was one of the first subscribers to the Detroit, Monroe and Toledo railroad, now part of the Lake Shore and Michigan Southern railroad; also one of the first directors of the Holly, Wayne and Monroe railroad, now part of the Flint and Pere Marquette railroad; president of the Monroe and Saline Plank Road company; one of the originators of the Young Ladies' Seminary at Monroe, Mich., which has been in operation since 1849; has delivered many addresses, which have been published. Married, September 19th, 1839, Lucy Chapel, of Pittsfield, Mass. Five children; two living. P. O. address, Monroe, Mich.

JAMES HALL, B. N. S., A. M., LL. D. *See Professors, page 141.*

JOHN HENRY PHILIP, A. B., (r. s.), (Kinderkook, N. Y.), son of John G. and Anna Margaret (Kittle) Philip, was born at Claverack, Columbia county, N. Y., May 24th, 1811. Prepared at Kinderhook Academy, Mr. Gleason, teacher. Entered the Institute in 1830. After he was graduated he studied medicine, and practiced his profession of physician and surgeon in Valatie, Stockport and Mellenville. He received the degree of M. D. from the Castleton, Vt., Medical College. Married, June 3d, 1883, Lucena B. Woodward, daughter of Theodore Woodward, M. D. Four children. He was killed, December 17th, 1859, in Mellenville, Columbia county, N. Y., by the cars.

SAMUEL WELLS WILLIAMS, A. B., (r. s.), LL. D., was born in Utica, N. Y., September 22, 1812. His father, W. Williams, was a leading bookseller and printer in that city, and the constant access in his early days to the ever changing collection of books in the store induced a taste for reading, which was promoted by

temporary clerkships and other duties in the establishment. While at the Institute he was offered the position of assistant professor, but accepted a proposal to go to Canton, China, and take charge of the press then established there in connection with the mission of the American Board. His departure was deferred till the following year, in June. On reaching Canton, in October, 1833, he began the study of the Chinese and Portuguese languages, in order to carry on the office, and assisted in the meantime in editing the *Chinese Repository*, a monthly publication in the English language, started the year before by Mr. Bridgman, of the same mission, and printed at its press. In 1835 he removed to Macao to complete the printing of "Medhurst's Hokkeën Dictionary," left unfinished by the East India Company. In 1837, this work being done, Mr. Williams went to Japan with C. W. King, an American merchant, who was taking to their homes seven shipwrecked Japanese to try whether they would be received by their countrymen. The vessel was driven away by cannon balls from two ports, and the men were brought back to Macao. Here Mr. Williams employed two of them in his office, and obtained an acquaintance with their language, at the same time, translating into English a treatise on smelting copper, and making a rough version of the books of Genesis and Matthew into Japanese for their use.

After the publication of Dr. Bridgman's "Chinese Chrestomathy," to which Mr. Williams contributed about one-third, he printed his "Easy Lessons in Chinese," at Macao, in 1861; then an "English and Chinese Vocabulary," in 1843, and the "Chinese Commercial Guide," in 1844. The last was a revised and enlarged edition of the work under this name, first issued in 1836 by J. R. Morrison, and now adapted to the new order of things under the recent treaties with Christian powers. In 1844 he set out for America, passing through Egypt, Syria and Europe, and reached New York in October, 1845. The project of cutting the matrices for a set of movable Chinese type at Berlin, under Beyerhans' superintendence, had been started in conjunction with Walter Lowrie, of the Presbyterian Board of Missions, and to obtain funds for the enterprise Mr. Williams delivered many courses of lectures in the Northern States on the condition of China and its people, which were afterwards enlarged and published in New York in 1848, under the title of "The

Middle Kingdom." The trustees of Union College conferred on him soon after the title of LL. D.

On returning to Canton, in 1848, he took charge of the *Chinese Repository*, which publication was closed in 1851 with its twentieth volume, the enlarged openings for mission work and the establishment of newspapers having made its further issue unnecessary in connection with the Board as a means of diffusing correct information upon China. In 1853 and 1854 he accompanied Com. Perry's squadron to Japan, as interpreter, and aided in removing the fears of the Japanese authorities as to the hostile intentions of that expedition, and explaining clearly its real purposes.

In 1855 he was appointed Secretary of Legation and Chinese interpreter, and took charge of the United States Legation till the arrival of the minister, Hon. Peter Parker, in January, 1856. In that year he published his "Tonic Dictionary of the Chinese Language in the Canton Dialect," (8vo. 900 pp.) on which he had been engaged eight years. It has served as the model for other similar works in the Fuhchan and Amoy dialects, and been useful to students of all the dialects. In December, not long after its completion, the mission printing office and all its contents and stock of books remaining after twenty-two years of constant work, in all numbering about 7,000 volumes, were burned at Canton, when the foreign factories were set on fire by the Chinese government; but, happily, the entire stock of the "Tonic Dictionary," and of a new edition, (the fourth,) of the "Commercial Guide," were both saved.

This loss induced Mr. Williams to keep his post in the legation, and resign his connection with the mission at Canton. In 1858 he went to Tientsin with Mr. Reed, to assist in the negotiations connected with the American treaty, and the next year accompanied Mr. Ward to Pekin to exchange its ratifications. An account of this visit, and the remarkable discussion with the Chinese officials about the *kotow*, or prostration, before the Emperor, was published by Mr. Williams in *Bidwell's Eclectic Magazine* for 1861. On returning to the south of China, he took advantage of a leave of absence, and revisited America, coming by way of California, and reaching New York in June, 1860. While in this country, he delivered lectures before the Smithsonian Institute and elsewhere, and issued an edition of "The

Middle Kingdom," with a short prefatory chapter upon the war with Great Britain and China, and its consequent openings for commerce and intercourse.

In October, 1861, on reaching Canton, Mr. Williams, in addition to the duties in the legation, began to prepare the fifth and enlarged edition of the "Commercial Guide," which was issued at Hong Kong in 1863, in a volume of 662 pp. 8 vo., and has since remained the standard authority on the matters there treated. The United States legation was established at Pekin in 1862, where Mr. Williams resided until 1875. In 1863 he began the preparation of a larger Chinese Dictionary in the court dialect, but designed to aid in learning the universal written language, rather than any particular spoken dialect. The preparation was continued from year to year, interrupted frequently by his duties as charge d'affaires during the absence of a full minister, when the functions of minister, translator and interpreter came upon him alone, and allowed no time for other pursuits. In 1871 the copy was ready for the press, and the book was finished in June, 1874, in one quarto volume of 1334 pages, containing 12,527 characters, with their pronunciation as used at Pekin, Canton, Amoy and Shanghai. This "Syllabic Dictionary of the Chinese Language" has taken the place of all other Chinese and English dictionaries, and is an enduring witness to extraordinary learning and research. The monotonous labor of carrying it through the press, and the discharge of the duties of charge d' affaires, for sixteen months immediately after, proved altogether a heavy strain upon his health, and in April, 1875, Mr. Williams left China for the third time in forty-two years since his arrival. The needed relaxation proved to be all that was required to restore his health. In 1876 he was appointed professor of Chinese and Oriental literature at Yale College, and took up his residence in New Haven, Conn., where he remained until his death, February 16th, 1884. He was married, in 1847, to Sarah Walworth, of Shellsburg, N. Y., who died at New Haven, January 26th, 1881.

CLASS OF 1833.

JOHN GARDNER AMBLER, A. B., (r. s.,) M. D., son of John and Mary (Wheeler) Ambler, was born in Amblersville, town of New Berlin, Chenango county, N. Y., September 2d, 1816. He

attended village school until ten years of age, then went to Truxton Academy, in Truxton, Cortland county, N. Y., and in 1832 entered the Institute. After graduation he commenced the study of medicine, and attended lectures in the College of Physicians and Surgeons, New York city, after which he studied dentistry. He commenced practice in Waterford, N. Y., but went to Philadelphia in 1836, where he relinquished his profession and was for several years engaged in the purification and clarification of cotton seed oil. He returned to New York in 1842, and resumed the practice of dentistry, which he continued till the time of his death. He was president of the village of Dobb's Ferry, Westchester county, N. Y., 1879–80–81; also president of the board of health for three years; a delegate to the Baltimore convention which nominated Millard Fillmore for President of the United States; received the honorary degree of M. D. from the University of Pennsylvania; an honorary member of the Dental Society of New Jersey, of the Maryland and District of Columbia Dental Society, Pennsylvania Dental Society, New England Dental and Surgical Society, and Iowa Society of Dental Surgeons; a life member of the American Dental Association, and for five years president of the American Dental Convention. He received various gold, silver and bronze medals of honor from the world's fairs in London and New York; also from the Massachusetts Mechanics' Institute of Boston, Franklin Institute of Philadelphia, American Institute of New York, etc., for improvements in artificial teeth and perfection in artificial appliances, instruments and implements. He has written pamplets on professional subjects, addresses, poems, etc., and edited several journals. He married, June 6th, 1836, Rachael Norris Tees, daughter of Jacob Tees, of Philadelphia. Nine children. He died at his home in Dobb's Ferry, N. Y., April 6th, 1885.

EDWIN BRYANT CROCKER, A. B., (r. s.), son of Isaac Crocker, was born at Jamesville, Onondaga county, New York, on the 26th day of April, 1818, and was the eldest of five children, Charles, Clark W., Henry S., and Sarah constituting the other members of the family. The family removed subsequently to Troy, where Edwin B. was educated, graduating at an early age from the Institute. On his graduation he entered upon the pro-

fession of civil engineer, for which his studies had especially fitted him.

He was occupied for a time in his profession, and engaged in laying out several railroad lines. His father had removed, in the meantime, to Detroit, Mich., where he engaged in mercantile pursuits, and was unsuccessful. The family then removed to Northern Indiana, whither the subject of our sketch accompanied them, and in 1836 settled in Marshall county, where they all entered upon the laborious work of cutting down the forests and clearing the land, ready for the plow. The rough work of the pioneer, however, neither accorded with the taste or ministered to the ambition of young Crocker, whose aspirations were for a professional career, though not the one first chosen. After spending about one year on the new farm, he removed to South Bend, St. Joseph's county, where he entered the law office of J. S. Jernegan, and commenced the study of law. His rapid progress in his studies and his intuitive perception of the underlying principles of law, were deemed prophetic of a distinguished professional career. The prophecies inspired by youthful promise were ultimately realized in the substantial attainments and eminent abilities as a jurist of Judge Crocker.

Admitted to the bar of the circuit court of Indiana, over which Judge Sample, then a distinguished jurist, presided, he began practice in 1842, and entered into co-partnership with his preceptor, Mr. Jernegan. This co-partnership continued until 1847, when the senior partner removed to New York, and Mr. Crocker succeeded to the business of the firm, conducting it with great success, and distinguishing himself in the courts of his adopted State as a professional lawyer and able advocate.

Notwithstanding the magnitude and remunerative character of his practice in Indiana, the attractions of California, which were then drawing multitudes in that direction, were too powerful to be resisted, and yielding to the general westward impulse, he migrated to the Pacific slope in 1852, and settled in Sacramento. Mr. Crocker immediately took rank among the ablest members of the California bar, securing a large clientage and remunerative practice. He formed a co-partnership, soon after his arrival in Sacramento, with Messrs. Robertson and McKeene, under the style of Robinson, Crocker & McKeene. Mr. Crocker's previous study and practice of the law had not been so much of

codes and acts, as of the common law, handed down to us by the recorded decisions of the courts; a fact which goes far to explain his eminent success as a lawyer, in a state where legislation was meagre, and the laws were in a somewhat inchoate condition. His familiarity with the common law gave to his opinions great weight, and he rarely erred in judgment in any matter in which common-law principles were involved. Few antagonists retired from the arena after a contest with Mr. Crocker, without confessing the Damascene temper of his blade and the strength of his arm. But, however keen the blade and powerful the stroke given in the court-room, Mr. Crocker never carried any asperities beyond its portals; and a large fund of good nature with which he was endowed, and a certain magnanimity which always characterized him, quickly softened those which had been enkindled in the breast of his opponent, in the excitement of debate. Those who entered the lists with him, could not presume on his being unprepared for the encounter, or expect to find him napping. Always on the alert, always watchful, and industrious almost beyond example, he was prepared at every point. Although not endowed with brilliancy of genius or oratorical gifts, he possessed the more substantial and valuable quality of sound common sense, discriminating judgment and manly independence. His cotemporaries at the bar always reckoned him "a foeman worthy of their steel," and prepared themselves accordingly. A defeat at his hands had its mitigations in the acknowledged eminent ability of their antagonist, and in the magnanimity with which he always regarded the vanquished. But the mind of Mr. Crocker was too judicial in its character to find its most congenial field in the *ex parte* work of the bar, and he was soon elected to the bench.

Upon the resignation of Chief Justice Field from the bench of the supreme court of California in 1863, Governor Leland Stanford appointed Mr. Crocker to fill the vacancy for the unexpired portion of his term; which he did with marked fidelity and ability. Judge Crocker's judicial career was distinguished for its energy, impartiality, breadth of judgment, and fearlessness. He held the scale of justice with even balance, and allowed neither prejudice nor favoritism knowingly to swerve him a hair's breadth from the right. His decisions were made in accordance with those principles which his intuition taught

him must underlie all law, determining in obscure cases and in the absence of special acts, what the law was, from what it should be. The common law decisions, and his own clear apprehension of what should be law, greatly molded his character as a judge; and, while thoroughly read-up in his profession as a lawyer, and familiar with all the leading authorities, he is believed to have owed the general correctness of his decisions rather to the remarkable judicial character of his mind, and his intuitive perception of justice, than to proceedings and authorities. His decisions occupy, with others, three volumes of reports, and these decisions have rarely been reversed by subsequent ones, but have, with scarcely an exception, stood the test of time. Always fearless in the expression of his opinions, he carried to the bench of the supreme court the same quality; and he was never afraid to render a decision in accordance with his own solemn convictions of the claims of justice. His ability to comprehend the law and the facts in a case, to scan the evidence and eliminate the irrelevant, to judge of the credibility of witnesses, and to bring out of the chaos of conflicting testimony and of conflicting authorities a prompt decision in accordance with justice, has rarely, if ever, been equalled by any judge of the supreme court of California. He dispatched as much business, and wrote as many opinions, as any three judges who had occupied the bench, and did much to relieve the overcrowded docket of the court. The ceaseless and tireless industry of Judge Crocker, which allowed no respite from toil, and permitted no relaxation, is believed to have contributed largely to the development of the disease which brought him prematurely to the grave.

Upon the expiration of his judicial term, he became counsel for the Central Pacific railroad, and with Leland Stanford, Charles Crocker, his brother, Mark Hopkins and C. P. Huntington, he became the zealous friend of that project; and he is believed to have done as much as any one of these distinguished gentlemen to push the grand enterprise to success. He acted not only as counsel for the Central Pacific railroad, but as its general agent, and in both these laborious and responsible offices showed eminent abilities, and performed Herculean labors. To Judge Crocker, equally with the other recognized far-sighted and indomitable workers in that grand railway enterprise which

has united the Atlantic and the Pacific, bound together in the National Union the East and the West, and opened up a new highway between Europe and Asia, is due the gratitude of the nation. At the meeting of the Sacramento bar on the occasion of Judge Crocker's death, it was eloquently remarked: "Judge Crocker will not need a monumental shaft to perpetuate his memory; his name is inscribed on the iron lines over the broad fields of California; it is cut in our mountains; it is imprinted on the everlasting rocks, and there it will remain forever."

In June, 1868, while engaged in a very important legal case in San Francisco, he experienced the first attack of that mysterious disease which ultimately terminated prematurely his useful and noble career. He had returned to his hotel, and sought his own room, when attacked with paralysis. From this attack he never fully recovered, although he survived several years, and at times it was hoped he might be fully restored. He returned home, and remained in the bosom of his family thereafter, without again assuming the burden of business. He went with his family to Europe, and spent two or three years, mostly in Dresden, where he gathered a valuable and costly collection of paintings, which he placed in a magnificent gallery which he had built next to his own palatial residence in Sacramento. Both the gallery and the collection of works of art are considered the finest on this continent belonging to a private citizen. In this collection are many valuable works by the old masters, but most of them are by cotemporary or more recent artists, and many of them of great merit. Judge Crocker showed, in making this collection, not only his own love of fine arts, but his love of the artists themselves, many of whom were in need of a patron, as artists have been wont to be in all time, and they found a generous one in him. This gallery of art will long stand as a monument to Judge Crocker's liberality and public spirit; it never having been restricted to private persons, but always having having been free for the enjoyment of all. The same generous disposition to make it minister to the enjoyment and education of the public in art, which Judge Crocker manifested, is now shown by his noble and estimable widow, who seems to have received, not only this valuable bequest, but the princely fortune left her, as a legacy in trust, to be used in accordance with the

generous plans and the sympathetic and great-hearted disposition of her husband.

Judge Crocker died at his residence in Sacramento, Cal., on on the 24th of June, 1875, inflicting upon that city and upon the state an irreparable loss. The bar, of which he had been so distinguished a member, met, and addresses appropriate to the occasion were made by several of its leading members, deploring his untimely death at the age of fifty-seven, and paying a noble tribute to his memory. The following resolution, among others, was adopted:

Resolved, That we mourn the loss of this well-tried and faithful member of this profession, this enterprising and upright member of society, and this true friend of humanity. His works following him bear testimony to a well-spent life.

The funeral took place from his late residence, and a large number of friends, from all parts of the state, crowded the spacious parlors of the mansion. The Rev. Dr. Dovinett paid an eloquent tribute to the virtues and memory of the deceased.

In politics Judge Crocker was a Republican of the most pronounced character. His sympathies were always with the oppressed, and his sense of justice revolted at the enslavement of the negro. While in Indiana, he defended, voluntarily offering his services, several fugitive slaves, and suffered serious loss on their account. During the late civil war he was one of the most fearless and outspoken friends of the Union. His patriotism was a distinguishing trait of his character, and he never hesitated to defend his country's honor and integrity. In religion he was a Congregationalist, and, up to the time of his sickness, was a regular attendant at church.

Judge Crocker was twice married; first to Miss Mary Norton, daughter of Dr. Norton, of Canandaigua, N. Y., by whom he had one daughter, Mary, now Mrs. Myron P. Walker, of New York city. He was subsequently married to Miss Margaret E. Rhodes, daughter of John Rhodes, Esq., of Pennsylvania, by whom he had five children. The only son died in infancy, and of the four daughters only two survive. The eldest, Kate Eugenie, married J. B. Gunn, but survived only a few months; the second, Nellie Margaret, died in New York city, while on a visit to her friends, a few years ago; the third, Jennie Louise,

married Hon. J. Sloat Fassett, and now resides in Elmira, N. Y.; the fourth, Amy Isabella, married R. Porter Ashe, and resides in San Francisco, Cal.

Judge Crocker's social and family ties were exceedingly strong, he having always been fond of his family and devoted to friends. He was distinguished in social life for his geniality and hospitality, and his memory will not only be cherished in the professional and business circles in which he moved, as a man of eminent ability and worth, but, among his large circle of friends and by his family, as a true and sympathizing friend, husband and father. His great achievements in behalf of his profession, his city, his state, and his country, will not live longer in the memory of his cotemporaries, than his social and domestic virtues in the hearts of his family and friends.

HENRY J. MABBETT, A. B., (r. s.), was from Dutchess county, N. Y., and was an agriculturist.

WILLIAM S. SANDERS, A. B., (r. s.), M. D., Shushan, N. Y. He afterward studied medicine, and resided in Salem, N. Y. He resided for many years in Sturbridge, Mass., and was a practicing physician. Has been dead for several years, and none of the family reside in Sturbridge at present.

DAVID CADY SMITH, (r. s.), (Amsterdam, N. Y.), son of George and Sarah (Smith) Smith, was born in Florida, Montgomery county, N. Y. Entered the Institute in 1832; commenced reading law September 3d, 1833, in Schenectady, N. Y., and admitted to the bar May 12th, 1837; commenced practice in Schenectady, upon being admitted, and has continued there ever since, practicing his profession; surrogate of Schenectady county, 1843 to 1848. He married, October 31st, 1849, Eleanor F. Carley, daughter of Gerardus Q. Carley, of Schenectady. Four children. P. O. address, Schenectady, N. Y.

ALEXANDER VAN RENSSELAER, A. B., (r. s.), M. D. *See Trustees, page 76.*

BLEEKER B. WOODWORTH, A. B., (r. s.), is noticed in the triennial catalogue of 1833 as lecturer on experimental and demonstrative sciences, at Utica, N. Y.

CLASS OF 1834.

THERON R. HOPKINS, A. B., (r. s.), C. E., was from Dutchess county, N. Y., and has been noticed in the register for many years as "merchant," in San Francisco, Cal.

SAMUEL REYNOLDS HOUSE, A. B., (r. s.), A. M., M. D., son of John and Abby (Platt) House, was born in Waterford, Saratoga county, N. Y., October 16th, 1817. He entered the Institute in 1833. Before entering he was fitted for college by Professor Taylor Lewis, then principal of the Waterford Academy. He entered Dartmouth sophomore class, winter term, 1834–35; graduated at Union College in 1837; had charge of a school in Virginia, afterwards was principal of Weston Academy, Conn.; attended medical lectures at the University of Pennsylvania in the winter of 1841–2, the Albany Medical College in 1843, and graduated at the College of Physicians and Surgeons, New York, in 1845; was appointed by the president of the Board of Foreign Missions a medical missionary to Siam, and sailed from New York, July 27th, 1846, arriving in Bangkok, March, 1847; during a visit home in January, 1856, was ordained a minister of the Presbyterian church by the Presbytery of Troy; obliged to leave Siam in consequence of his wife's ill health; returned to the United States in 1876, after nearly thirty years connection with the mission to Siam; received the honorary degree of A. M. from Union College, 1840; corresponding member of the "American Oriental Society; published an article in the *Knickerbocker Magazine*, April, 1845, entitled "The Chemist's Dream," also a pamphlet entitled "Notes on Obstetric Practice in Siam," N. Y., 1879. He married, November 27th, 1855, Harriet M. Pettit, daughter of John Pettit, of Newark, N. J. P. O. address, Waterford, Saratoga county, N. Y.

PHILO D. WHITTLESEY, A. B., (r. s.), was from Catskill, N. Y., and was a student in engineering and general science. He was afterward a merchant in New York city. Deceased.

CLASS OF 1835.

CALEB BRIGGS, B. N. S., C. E., M. D., was born in 1812. Soon after graduation he went to Ohio, and practiced his profession of

civil engineering. He then studied medicine, and was a physician in North Rochester, Mass. Deceased.

WILLIAM H. CLEMENT, C. E., was born at Saratoga Springs, N. Y., July 30th, 1815. He entered the Institute in the autumn of 1833, and graduated in 1835. Assistant division engineer on the Utica and Schenectady railroad until its completion in August, 1836; the remainder of that year was assistant resident engineer on a survey from Toronto to the mouth of the Notteraugua river, in Canada, R. M. Shoemaker, resident engineer; in 1837 he went to Ohio as assistant to R. M. Shoemaker, who had charge of the construction of the Mad River and Lake railroad to Sandusky, Dayton and Cincinnati railroad; in the spring of 1838 was engaged in railroad surveys in Michigan; in the autumn of 1838 went to Cincinnati as resident engineer of the Miami railroad, and there remained until 1857, with the exception of two and a half years, when he acted as general superintendent of the Ohio and Mississippi railroad, as engineer, superintendent and president. He then retired from active railroad life, and having purchased land in Ohio, at Morrow, Warren county, became a half farmer and half fisherman, spending some time each year on the lakes of Maine. Married; two sons and two daughters living.

JOSEPH B. COTTMAN, B. N. S., was born in Micomico, Md., in 1817. After graduation returned to Maryland, and lectured on the natural sciences.

JACOB F. EDDY, C. E., was born in Pittstown, N. Y., in 1818. He practiced civil engineering in Chicago, Ill. Deceased.

ROBERT G. MCKEE, C. E., son of Aaron and Martha (Henry) McKee, was born at Arlington, Bennington county, Vt., January 10th, 1813. Prepared for the Institute at Cambridge Academy, Cambridge, N. Y. He moved to Clinton county, Michigan, in 1836; surveyed roads, farms, etc., for several years, and also engaged in farming; went to California in 1852, returning in 1856, and located on a farm in Sciota, Mich., remaining there till 1884; was representative of the counties of Clinton, Shiawassee and Genesee in the Michigan Legislature in 1839; supervisor of township of Victor one year; chairman of Board of Supervisors of Clinton county five years, and sheriff of Clinton

county in 1850–52. Married, June 15th, 1858, Armina L. McClintock, daughter of Dr. A. McClintock. Four children. P. O. address, Eaton Rapids, Eaton county, Mich.

DAN STORRS SMALLEY, B. N. S., C. E., was born October 9th, 1810, in Higham, Mass.. Has been principal of a classical school at Jamaica Plain, Suffolk county, Mass., for many years, where he still resides (August, 1885).

EDWARD SUFFERN, C. E., son of John S. and Elizabeth (Suffern) Suffern, was born at Elmira, Chemung county, N. Y., January 23d, 1810. He resided at Elmira, and was a cadet at West Point, N. Y., before entering the Institute. Was civil engineer on the New York Central railroad; built part of the Erie railroad, and bridge at Susquehanna; city surveyor at Sacramento in 1853. Married, in 1844, Elizabeth Parker, of Lyons, N. Y. Two children. Wife died in 1847. Married, at Wilmington, Ill., Isabella Suffern, daughter of William Suffern, of Coal City, Ill. He died at Coal City, Ill., February 22d, 1877.

MICHAEL TUOMEY, B. N. S., son of Thomas and Nora (Foley) Tuomey, was born at Ash, Ireland, St. Michael's Day, 1808. It is believed that his only instructor before entering the Institute was his mother. On his arrival in America he undertook farming, but finding this unsatisfactory, he began such study as led him to seek the advnatages which the Institute offered. Was private tutor, in Somerset county, Maryland; civil engineer; state geologist, South Carolina, also of Alabama; professor of geology and natural history in the university of Alabama; member of the Boston Society of Natural History, and of the American Association for the Advancement of Science; wrote report on the geology of South Carolina, reports on geology of Alabama, and "The Fossils of South Carolina," written in connection with Dr. Francis S. Holmes of South Carolina. Married, in 1840, Sarah Elizabeth Hardy, daughter of Robert T. Hardy, of Maryland. Two children; one living. He died at Tuscaloosa, Ala., March 30th, 1857.

AMOS WESTCOTT, C. E., B. N. S., M. D., son of Gardner Westcott, was born in Truxton, Cortland county, N. Y., about 1814, and was the youngest of seven sons. In virtue of his seventh sonship, he was many times called upon to lay his hands upon

the sick, especially cases of scrofula. As a boy he manifested a strong desire to obtain an education beyond the ability of his parents to give. They yielded to his wish to educate himself, which he was enabled to do by teaching school in winter and attending the academy in summer. He continued his studies and teaching up to 1834, when he entered the Institute, and graduated in 1835. He then began the study of medicine, reading in his native town and attending lectures in Albany, where he graduated. He then devoted himself to general practice, until 1844, when he gave his time wholly to dentistry. He was one of the founders of the *American Journal of Dental Science*, and one of the founders and first president of the New York State Dental Society. In 1852 he obtained a charter for a Dental College, to be located at Syracuse, which ran a short career, owing probably to the fact that it was not needed. He died in Syracuse, N. Y., about 1874, where he had lived for a number of years.

WORTHINGTON BUCKINGHAM WILLIAMS, C. E., son of Josiah and Martha (Loomis) Williams, was born in the city of New York, December 20th, 1815. He prepared at Dutchess County Academy, Poughkeepsie, N. Y., entered the Institute, and after graduation entered upon his profession. He went to Indiana at a time when the internal improvement system of the State exploded. His father invested in lands for his benefit in 1836, and he has remained with the land up to date. Engaged in merchandizing at Putnamville, Putnam county, Ind., and farming on his land since, about two miles from Putnamville. Married July 13th, 1837, Lydia Ann Lapsley Reed, daughter of Rev. Isaac Reed. Eleven children. His oldest son, Josiah C., was captain of company C, 27th Indiana Volunteers, and another, Edwin M., sergeant in the 115th Regiment Indiana Volunteers in the war of the rebellion. One daughter, Flua, married J. H. G. Weaver, an ex-soldier, a graduate of Hillsdale College, Mich., and of the law department of the State University, Mich. They are settled at Eureka, Humboldt county, Cal. Has twice been in the Legislature; acting in the last one as speaker, *pro tem.* Another daughter is a graduate of the Indiana State Normal College, and is teaching in Arcata, Cal. P. O. address, Putnamville, Putnam Co., Ind.

CLASS OF 1836.

JAMES SHODBREAD DRAYTON, B. N. S., was born in Charleston, S. C., April 22d, 1820. Nothing has been heard of him for many years.

ANTHONY WALTON WHITE EVANS, C. E., son of Thomas M. and Eliza M. (White) Evans, was born in New Brunswick, Middlesex county, N. J., October 31st, 1817. He attended the grammar and classical school of Rutgers College, N. J., and entered the Institute in 1834. October, 1836, he commenced work as assistant engineer on the Erie canal, at Lyons, Syracuse, Troy and Albany. In 1845 was assistant engineer of the Harlem Railroad extension to Albany; in 1846 became resident engineer of that work, and left it in 1849. In 1850 he went to Chile, in South America, to build the Copiapo railroad, remaining in charge until the completion of the work in 1853. While there he built the first pier ever built on the coast of South America. In 1853 he was chief engineer of the Arica and Tacua railroad, in Peru, completing the road in 1856, when he returned to the United States. In the fall of 1856 he went again to Chile to build the Southern railroad of Chile, fifty miles, which was completed in 1860, and he then spent two years in visiting, studying and examining public works. In 1862 he was appointed engineer of harbor defenses of the port of New York, and during the civil war planned the obstructions for this channel, and remained in the service until near the close of the war. In 1864 he was president of the United States Petroleum company; in 1866 went to England to examine and report on the Underground railway of London, then to Germany and to Russia to see and report on the railways and the qualities of iron used; returning to the United States, became connected with many railways in South America as consulting engineer, and was also president of the Spuyten Duyvil rolling mill company; up to 1878 had charge of supplying, designing and sending out a great quantity of railway plant, including many iron bridges, to the railways in Peru; during these years was also engaged in having built for Australia, New Zealand and Mexico a large amount of railway plant of every kind; since 1879 has devoted much time to study and acting as consulting and supplying engineer to

many railways in South America and Mexico, and now, at the age of sixty-nine, and after having worked for a half-century, he, in connection with Mr. P. H. Dudley, has entered upon a new study, illustrating and publishing, photo-micrographically, the nature and structure of all important American woods. He is a member of the American Geographical Society, and was a member of the council for seventeen years; member of Institute of Civil Engineers of England, also of the American Society of Civil Engineers, and of the Franklin Institute of Pennsylvania; honorary member of the Master Mechanics' Association, and member of the Society of the Cincinnati, in 1842. Has published many pamphlets and reports. Married, June 24th, 1856, Anna Zimmerman, daughter of John C. Zimmerman, of New York. His wife died in June, 1877. Three children; one living. P. O. address, Sans Souci, New Rochelle, N. Y.

TYRUS W. HURD, C. E., M. D., was born in Arlington, Bennington county, Vt., April 3d, 1818. He entered the Institute in the spring of 1836, and was graduated in the autumn of the same year. In the spring of 1837 was draughtsman on the Clinton and Kalamazoo canal and railroad, Michigan; was soon promoted to assistant engineer; resigned in the spring of 1838, on account of ill health, and became one of the managers of the National Theatre, at Detroit, Mich.; traveled with the company from Buffalo to Chicago, south to St. Louis, Natchez, Memphis, New Orleans, etc.; in spring of 1839 was assistant engineer on the Cattaraugus and Connewango canal, running south from Buffalo; finished medical studies in 1840, and engaged in the drug business in his native town; removed to Jackson, Washington county, N. Y., and there settled upon a farm; in 1846 entered the wholesale grocery business in New York city, and traveled South and West; in February, 1848, received the appointment of surgeon on the ship Morrison, and sailed for San Francisco, around Cape Horn, reaching his destination in September; began the practice of medicine in Sacramento in 1853; was appointed surgeon in the Eldorado Indian war, under Colonel William Rogers, and served to its close; continued in practice in Sacramento until April, 1846, when he returned to New York by way of Nicaragua; during winter of 1867 was assistant engineer on the Union Pacific railroad, and in the spring was division

engineer until the junction with the Central Pacific railroad, May 10th, 1869; he then returned to the practice of medicine. He married, while a resident of Jackson, Mary Billings. Two childen, a son and daughter. P. O. address, Bullion City, Elko county, Nevada.

AARON GARDNER MCKEE, C. E., (Arlington, Vt.), son of Aaron and Martha (Henry) McKee, was born in West Arlington, Bennington county, Vt., June 10th, 1815. He attended the Union Academy of Bennington, and Burr and Burton Seminary, of Manchester, Vt.; entered the Institute in 1836, and in the spring of 1837, upon the work of his profession, in the state of Michigan; was three years in the employ of the state government; since 1840, engaged in farming, with occasional land surveying; was elected representative of Arlington in the Vermont State Legislature in 1870; soon after served as first selectman in Arlington, Vt.; was for several years town superintendent of schools, and for many years justice of the peace for Bennington county. Married, August 24th, 1847, Cynthia A. Buck, daughter of Captain Samuel Buck; wife died August 27th, 1875, leaving three children. Married, May 20th, 1879, Margaret Ann Turner Buck, daughter of Charles Grandison Turner, and widow of Charles H. Buck. P. O. address, West Arlington, Vt.

STEPHEN VAN RENSSELAER PATERSON, C. E., son of William Bell and Jane E. (Neilson) Paterson, was born in Perth Amboy, N. J., May 31st, 1817. The early years of his life were passed at Morristown, N. J., under the immediate care and instruction of his father. He entered the College of New Jersey at Princeton, in October, 1832, graduating with honors in September, 1835. He soon after entered the Institute, remaining one year under the special instruction of Professor Amos Eaton, graduating in 1836. He entered on his career as an assistant engineer on the Genesee Valley canal in 1836; he remained on the construction of this canal for some years, afterward devoting himself to literary pursuits; in 1840 returned to Perth Amboy, N. J., and in 1842 was appointed surveyor-general to the board of proprietors of East New Jersey, holding this position three years; afterwards was engaged in business and literary pursuits. He filled a number of city offices, among them that of city surveyor, at Perth Amboy, the first regular system for grading and regu-

lating the squares and streets of the city being carried out under his direction. He left this position to assume the cashiership of the Bank, organized in 1856, which position he retained during the existence of that corporation. While thus engaged he accepted again the office of surveyor-general, but resigned the position in 1866, and spent some years of leisure in New York. Returning to Perth Amboy in 1870, he resumed his former position of city surveyor, continuing in that service and other branches of his profession until his death, February 24th, 1872. Married, December, 1852, Emily S. King, daughter of Charles King, the president of Columbia college, New York. His wife died in April, 1853.

ISRAEL SLADE, 2D., C. E., B. N. S., (Pittstown, N. Y.), was born in Brunswick, Rensselaer county, N. Y., November 27th, 1815. His last address known was Springfield, West Virginia, but does not reside there at present.

SHERMAN VAN NESS, C. E., B. N. S., son of John G. and Martha (Sherman) Van Ness, was born in Chatham, Columbia county, N. Y., November 4th, 1817. Prepared at Nassau Academy, Rensselaer county, N. Y., and with Hon. Lucas Hoes, surveyor, Kinderhook, Columbia county, N. Y., and entered the Institute in 1834. At Chatham, 1836 to 1861; Hudson river from 1861; farmer, in connection with surveying, from 1844 to 1861. assistant engineer of Hudson water works from 1880 to 1874; supervisor of town of Chatham, 1861; sheriff of Columbia county, 1862 to 1865; county commissioner of excise, 1867 to 1870; supervisor first ward, Hudson, 1871 to 1879; city surveyor of Hudson, 1867 to 1878; chairman board of supervisors of Columbia county, 1871–74–78. Married, September 28th, 1843, Clarissa Riche, daughter of Harvey Riche. Five children. P. O. address, Hudson, Columbia county, N. Y.

NATHAN RANSEL WILDE, C. E., B. N. S., son of Nathan and Rachel (Newcomb) Wilde, was born at Chesterfield, Cheshire county, New Hampshire, July 14th, 1815. He attended the Chesterfield Academy, but received most of the preparation necessary from his father, who, when young, applied himself assiduously to the study of surveying and astronomy, and soon became one of the most skilful surveyors in the state and an

astronomer of considerable proficiency. In 1819 he published an almanac, known as the "Farmers', Mechanics' and Gentlemen's Almanac," and continued its publication while he lived. He died March 5th, 1838. His son, Nathan R., continued its publication, while in the State. The father also held many civil offices, both in town and state. Nathan R. practiced his profession as occasion offered. He was at one time engaged in a preliminary survey for the Connecticut River in Vermont. In 1840 he removed to Green county, Indiana. Married, September 25th, 1838, Mary E., daughter of Abraham Wood. Five children; two living. Before leaving the state, he had held a commission, for some time, as justice of the peace, from the governor of New Hampshire. He died in Worthington, Green county, Ind., April 7th, 1851.

CLASS OF 1837.

LORENZO MEIGGS ARNOLD, C. E., B. N. S., son of Benedict and Mary (Bovee) Arnold, was born at Amsterdam, Montgomery county, N. Y., September 27th, 1818. Prepared at the Amsterdam Academy, and entered the Institute in April, 1836. He was appointed to a position in the civil engineer corps of the state of New York on the enlargement of the Erie canal, November 1st, 1837, and continued in the employ of the State until April 9th, 1844, when the work was discontinued. He was located most of the time in Schenectady, N. Y., and vicinity, and on leaving Schenectady in April, 1844, located in New York city, where he engaged in the importation and jobbing of fancy goods. In 1851 he was compelled to give up business on account of ill health, and traveled for one year, when he embarked in the insurance business at Albany, in January, 1852, remaining there until October, 1854, then returning to New York city, where he carried on the business of marine insurance and average adjuster until 1871, when he removed to Amsterdam, where he still resides. For six years he held the office of excise commissioner in Amsterdam, and acted as correspondent for several newspapers in New York and elsewhere during his travels. Married, May 19th, 1855, Mary A. Moore, daughter of J. W. Moore, of Brooklyn, N. Y. His wife died April 15th, 1877. P. O. address, Amsterdam, N. Y.

HENRY BAKER, C. E., (Waterford, N. Y.), was born March 19th, 1814, in Northumberland, N. Y., and died in 1873; he was buried in Waterford cemetery. His daughter is Mrs. Thos. Breslin.

BENJAMIN FRANKLIN BUCK, C. E., son of Samuel and Maria (Andrews) Buck, was born at Arlington, Bennington county, Vt., June 21st, 1816. Prepared for the Institute at the district school, West Arlington. His occupation was principally farming. Was assistant engineer for one year on a railroad in Michigan. He died in December, 1877.

CHARLES R. COOK, C. E., M. D., son of Rice and Ann Cook, was born August 20, 1820, at Stillwater, N. Y. He served as engineer on the Genesee Valley canal for about four years, graduated at the Albany Medical School in 1847, and practiced medicine in Troy until his death, August 5th, 1851.

EZRA THOMPSON GALE, C. E., Troy, N. Y. *See Vice Presidents, page 46.*

LEMAN BENTON GARLINGHOUSE, C. E., was born at Allen's Hill, near Canandaigua, state of New York, January 16, 1814. His father, Joseph Garlinghouse, was a farmer, though much of his time was passed in public life. He was twice elected sheriff of Ontario County, but never changed his residence to the county seat, (Canandaigua,) four miles distant, preferring to maintain his country house for his growing family. The father being so much away, the duties of the farm devolved on young Leman and his brothers. Exercise in the open air at this time of life developed a robust constitution, giving him ever after great endurance both in physical and mental exercise, and we may add the enjoyment of good health. On becoming of age, and having a little money of his own on hand, he determined to become a civil engineer, and entered the Institute to perfect the rough training of a country school. We believe he took up his residence at Troy in 1835, graduating two years later. While there he did more or less teaching in mathematics, as his services were required to assist the professors.

After leaving the Institute, he had no difficulty in securing a position as assistant engineer on some of the new railroads of his native State. In the enlargement of the Erie Canal he was

located at Lockport, N. Y., and was always enthusiastic in lending his best talents to this fine specimen of engineering construction. At that time this work was really a wonder.

It was while engaged on this public improvement that he met Miss Martha Ann Spalding, who became his wife June 2, 1841. The wedding took place at her eldest brother's, Lyman A. Spalding, who was the owner of extensive flouring mills at this time.

When work on the canal stopped through lack of funds, Mr. Garlinghouse went to his old home at Allen's Hlll. His temperament was too active to submit long to the monotony of a rural life. Accordingly in the spring of 1843, he opened the " Franklin House " at Canandaigua, remaining there five years. He evidently " knew how to run a hotel," for the house became famous under his management, and he accumulated money rapidly. The life, however, was distasteful, his mechanical turn of mind being on the alert for a change.

An opportunity offering, he embarked in a milling enterprise at Littleville, a small town about fifteen miles distant. This was quite an extensive property and included both lumber and flour mills. This venture proved unfortunate, so that in the summer of 1853 this property was disposed of and a smaller saw mill purchased at Canandaigua.

A grist mill was built and both mills operated for a number of years with varying success.

A little incident occurred at this time which well illustrates the value of a technical education. A new engine was purchased to run the flouring mill, the one used for the saw mill not being powerful enough for both mills. Instead of getting a *millwright* to set up the new machinery, Mr. Garlinghouse determined to do it *himself*. Accordingly the foundations were carefully superintended, and the new mechanism as carefully adjusted. This bold innovation on the proprietor's part, excited no little envy among the neighboring millwrights and they were loud in their predictions of an ignominious failure. As work progressed, however, these loud utterances diminished, so that on the trial day when everything moved off as if put up by a master hand, nothing but congratulations could be heard. At that date, long-stroke, slow-moving engines were the rule and considered best practice. Mr. Garlinghouse never liked them,

declaring them expensive to operate and liable to get out of order. The new engine conformed to his ideas, and was made quick-moving, short-stroke, taking steam at a high pressure. He never had occasion in after years to regret his choice. We know now that his theory is correct.

In the winter of 1860, Mr. Garlinghouse decided to transform the lumber department into a distillery. Logs in the neighborhood of the lake had begun to get scarce, so that the expense of getting them to mill would eat up the profits of the manufacture. He believed by making this change to render the property valuable. The grist department of the flouring mills was abandoned and the capacity of these mills devoted to supplying the distillery with meal and rye. In the spring of 1861 operations were begun and continued with great success for a number of years. During the war, business went by jerks, but on the whole, the general average was excellent. In 1870, he disposed of his distillery plant. The business had not been profitable for several years, chiefly on account of the complications in the revenue laws. He had become somewhat embarrasssed financially, and hoped by this means to retrieve himself. In this he would undoubtedly have succeeded had life been spared him. But fate decreed otherwise.

On the 24th of July, 1872, he was on the night train from Rochester to Canandaigua. He had worked very hard in Rochester all day, and after boarding the train fell asleep. He awoke just as the train was leaving Canandaigua. On ascertaining his location from a fellow passenger, he thought he could readily get off. The night was intensely dark, so it was impossible to see now fast the train was moving. His hearing being a little defective, his ears did not inform him of his danger. In stepping off the platform of the coach, he was hurled with great violence against a switch stand, sustaining such severe iujuries that he died two days later, passing away as easily as one falling asleep. He was conversing with his wife only a moment before death closed his active life forever.

Of his children, six sons and one daughter remained to mourn his untimely death. One daughter died in infancy. In order of birth these children were, Charles A., Amelia S., Arthur, Frederick L., W. Edward, Walter S., Carrie and Holmes S. All are living (1886) except Amelia as stated. His faithful wife died in

October, 1882. Both are buried beside their daughter at Canandaigua.

In stature Mr. Garlinghouse was five feet ten inches, weighing about one hundred and fifty pounds. He had full, deep blue eyes, light hair and beard. In disposition he was social and hopeful, disposed to look on the bright side of life. His domestic life was always happy, as he had one of the best of wives, and their temperaments harmonized completely. He always took a great interest in all engineering projects and kept himself well informed in regard to them. He looked back upon his Institute life with increasing pleasure as the years passed by. When his son Frederick expressed a desire to go to the Institute he was only too glad to make it a reality. He was a fine draughtsman and took pleasure in it. Possessing so many qualities which make the successful engineer, it was a pity he drifted out of the profession.

FLETCHER JOHN HAWLEY, C. E., B. N. S., D. D., son of David and Bethiah (Buck) Hawley, was born in Arlington, Bennington county, Vt., November 22d, 1813. Prepared at the Grammar School of Kenyon College, Gambier, Ohio, and at Burr Seminary, Manchester, Vt. He taught school winters, and entered the Institute in 1836. In 1837 he entered Union College, Schenectady, N. Y., in the sophomore class, graduating in July, 1840, and in October, 1840, entered the General Theological Seminary of the Protestant Episcopal church in the city of New York, graduating in June, 1843. He was ordained deacon in St. Stephen's church, New York city, in July, 1843, and priest in St. John's church, Hartford, Conn., 1845. His deaconate was passed at Canton, St. Lawrence county, and at St. Luke's Church, New York city. His priesthood was passed, from 1845 to 1859, in Santa Cruz, W. I.; from 1859 to 1862, in the city of New Orleans; at Trinity church, Chicago, Grace church, Brooklyn Heights, and St. James church, Danbury, Conn., 1864 to 1875; Grace church, Stafford Springs, Conn., from 1875 to 1880; from 1880 to the present time, rector of St. Paul's church, Brainerd, Crow Wing county, Minn., and dean of the northern convocation of the diocese and delegate to the general convention at Philadelphia in 1883. He built a new church at Christiansted, Santa Cruz, W. I.; also at Danbury, Conn., and another at Stafford.

Springs, Conn. He was appointed first crown member of the colonial council of the Danish West Indies, and received the honorary degree of D. D. from Norwich University in 1854. Visited Europe for his health in 1844, and traveled for seven months, visiting Great Britain, France, Spain, and Italy. Married, November 2d. 1853, Marion Canfield, daughter of Samuel Canfield, of Arlington, Vt. Two children. P. O. address, Brainerd, Crow Wing county, Minn.

GEORGE JOHNSON, C. E., B. N. S., (Ghent, Albany county, New York,) was born in Whitesboro, N. Y., November 22d, 1806.

LEVI LYNDON LOCKLING, C. E., B. N. S., son of David and Sally Lockling, was born in Holland, Orleans county, Vt., November 9th, 1810. He attended the Brownington Academy, Brownington, Orleans county, Vt., and also engaged in farming and school teaching. He entered the Institute in 1835 or 1836. In June, 1838, he was engaged upon the Croton aqueduct, at Tarrytown, N. Y., nearly one year; with city engineer during part of years 1839 and 1840; then, till spring of 1843, upon the Erie canal at Schenectady; 1843 and 1844, on United States survey of the upper lakes; 1845 and 1846, upon coast survey in Massachusetts and North Carolina; May, 1848, on Watertown and Rome railroad, remaining until April, 1851, when he took charge of a portion of the Michigan S. U. Indiana railroad; in 1853, on preliminary survey of Danville and Nashville railroad, Kentucky and Tennessee; September, 1853, on Terre Haute and Alton railroad, remaining two years; then on surveys for Milwaukee and Mississippi railroad, which failed to be built at that time; in 1872, made surveys for a railroad from San Diego to San Bernardino, Cal.; in 1836, was engaged in the foundry business at Dansville, Livingston county, N. Y., for one year; then in same business at Penfield, Monroe county, N. Y., for about same time; was city engineer at Hannibal, Mo., 1859 and 1860; city engineer at San Diego, Cal., 1872 to 1880, with exception of 1876 to 1878; county surveyor for San Diego county, and a member of the San Diego Society of Natural Sciences. Married, January 1st, 1839, Sarah Hollister, daughter of Dorastus Hollister, of Clifton Park, Saratoga county, N. Y. No children. Wife died April 2d, 1877. Married, August 24th, 1882, Helen M. Porter, daughter of Samuel N. Porter, of Albion, Mich. He

removed to San Diego, Cal., from Hannibal, Mo., in 1861, and has since resided there. He is now in Florida, and may make it his home. P. O. address, Orlando, Orange county, Florida.

JAMES OAKEY, C. E.. (Schaghticoke, N. Y.), was born in England, October 4th, 1815.

AARON BARLOW OLMSTEAD, C. E., B. N. S., A. M., (Weston, Conn.), was born at Malta, Saratoga county, N. Y., February 4th, 1812. Prepared at Ballston Academy, and under various teachers and private tutors. He took the Union College course of classical and mathematical studies, and worked on a farm and practiced surveying. Entering the Institute in 1836, he took the degree of C. E. in 1836, in 1837 the degree of B. N. S., and in 1839 the degree of A. M. In 1837, after finishing the regular course, he accepted a call as principal of the North Fairfield Academy, at Weston, (now Easton), Conn., and there spent two years in classical teaching. In 1839 he removed to Brighton Institute, near Bearn, Penn., where he spent one year in teaching mathematics, chemistry and natural history. In 1840 he entered Yale Law School; returned to Saratoga Springs in 1840, and continued the study of law in the office of Messrs. Beach and Cowen; was admitted to the bar in 1843, and practiced in that place; in 1848 removed to New York city, and engaged in teaching a select school for two years; removed to New Haven in 1849, and engaged in manufacturing; in 1853 removed to Essex county, N. Y., and engaged in a tannery; established a postoffice, called Olmsteadville; in 1857 returned to New York city and engaged in the practice of law, and in 1867 returned to Saratoga Springs, where he has since resided. He held the positions of president and general actuary of the Saratoga Savings Bank from 1867 to 1873, superintendent of schools at Saratoga in 1843 and 1844, deputy collector of the port of New York during the administration of President Lincoln; admitted as attorney at law and also solicitor in chancery, 1843; counselor at law and counselor in chancery, 1846; attorney and counselor in the supreme court of the United States, 1863; received the honorary degree of A. M. from Union college, 1848; corresponding member New York Historical Society. Married November

14, 1849, Caroline Clement, daughter of Joel Clement, of Saratoga, N. Y. Two children. P. O. address, Saratoga, Saratoga county, N. Y.

HORACE NORTON ROGERS, C. E., was from Hoosick, N. Y., and was born October 10th, 1817. He entered the Institute August 23d, 1836.

HENRY R. SNYDER, C. E., was born in Johnstown, N. Y., June 27th, 1812. Chief Engineer of the Atlantic and Ontario Railroad.

JAMES PHILLIPS WALLACE, C. E., New York city. *See Trustees, page 112.*

LEVI HALE WARREN, C. E., (Paterson, N. J.), was born at Stowe, Mass., July 23d, 1819. He entered the Institute December 10th, 1836.

CHARLES WHIPPLE, C. E., M. D., son of Stephen and Loisa (Edgerton) Whipple, was born at Shaftsbury, Bennington county, Vt., October 9th, 1815. He was a physician, and practiced in Haverstraw, Tarrytown and Nyack, N. Y. He died at Nyack, November 11th, 1859. Married, September 11th, 1845, Mary Conklin, of Haverstraw, N. Y. Five children.

JOHN WOODWORTH, JR., C. E. son of Hon. John Woodworth, a distinguished judge of the supreme court of the state of New York, was born in Albany, N. Y., October 10th, 1817. He entered the Institute June 30th, 1836. Deceased.

CLASS OF 1838.

HENRY J. AVERY, B. N. S., M. D., was born in Berlin, N. Y., February 1st, 1814, but at the time he entered the Institute resided in Petersburgh, N. Y. After graduation studied medicine, practiced this profession for some time in Amsterdam, N. Y., where he died several years since.

GEORGE WILLIAM READ BAYLEY, C. E., son of G. W. Bayley, was born at Saratoga, N. Y., November 30th, 1821. Entered the Institute, and graduated with class of 1838. Immediately after

graduating was employed upon the railroad from Albany to Buffalo. His health giving way, he went to sea, and spent two years in a tour around the world. Returning, he was employed upon the construction of the state prison at Clinton, N. Y. While thus engaged he accepted the position of assistant state engineer under Gen. P. O. Hebert, chief engineer of the state of Louisiana, residence Baton Rouge, where he remained until 1852. He held the position of chief engineer of the New Orleans and Opelousas Railroad for nearly ten years; was city surveyor of New Orleans, and assistant chief engineer and superintendent of the New Orleans and Chattanooga railroad. He wrote the "History of Railroads in Louisiana." When the contract was made by Congress for the improvement of the south pass of the Mississippi, by jetties, he was selected by Captain Eads as resident engineer, and as such continued until his death, December 4th, 1876. He wrote the article on the Mississippi in "Appleton's Encyclopedia." In 1875 and 1876 he served the Louisiana Levee company, as engineer and commissioner of levees, concurrently with the duties of resident engineer of the jetties, which positions he held until his death.

WILLIAM C. BAILEY, B. N. S., A. M., M. D., son of William and Harriet (Cady) Bailey, was born in New Lebanon, Columbia county, N. Y., May 5th, 1816. Attended the New Lebanon High School, and entered the Institute in 1836. He entered upon the work of his profession in 1844, in Hadley, Mass., and Chatham, N. Y.; was coroner of Columbia county; the Chatham Graded School was designed and built under his direction; president and member of the board of Chatham Free School. Married, November, 1845, Elizabeth, daughter of Austin Hayden. Three children. Wife died March 3d, 1854. Married, August 10th, 1859, Julia M., daughter of Rev. S. Utley. P. O. address, Chatham, Columbia county, N. Y.

EZRA SLOCUM CARR, C. E., B. N. S., M. D., LL. D., was born in Stephentown, N. Y., March 9th, 1819. He graduated at the Institute in 1838, and was immediately employed in the State geological survey, for four years, conducted by Professors Hall and Vanuxem. Having finished a course of medical study, he received his medical diploma at the age of twenty-three, and soon after was appointed professor of chemistry and pharmacy

in the Medical College at Castleton, Vt., holding his chair twelve years, alternating between that and the Medical College at Philadelphia, in which he held the same position. During this period honorary degrees were conferred upon him by both Williams and Middlebury College, in the latter of which he was acting professor of natural science, in 1853–54. Subsequently he was appointed to the chair of chemistry and pharmacy in the Medical College, and to that of chemistry and its application to the arts and agriculture in the University at Albany. The same year a similar position was tendered him in the University of Vermont. "While in Albany a course of scientific lectures which he delivered for the benefit of workingmen proved so valuable as to draw interest and benefactions to the institution in which they were given."

Some years later an appointment to the chairs of chemistry and natural history, and of chemistry as applied to agriculture, tendered him by the University of Wisconsin, induced Mr. Carr to remove to Madison. Here, while acting as one of a commission to make a geologieal survey of the State, "he enriched the University with a complete collection of the soils, minerals and productions of Wisconsin, thus forming one of the most perfect cabinets of the kind in the world." After eleven years of service at Madison, with three years of joint service in the Rush Medical College in Chicago, Dr. Carr, in 1868, resigned his position, that he might indulge in a year's vacation in California. While in Wisconsin he was for two years one of the Regents of its University, and the president of its State Medical Society for the same length of time.

In 1869 Dr. Carr had accepted the chair of medical chemistry in the Toland Medical College, San Francisco, Cal., and that of Agricultural Chemistry in the University of California, holding the latter position six years, when he was elected State superintendent of public instruction, a position he held for four years.

Nine years ago Dr. Carr and his family were living in Sacramento, himself and his wife being respectively state superintendent and assistant superintendent of public instruction. Over forty years of arduous service in educational fields had seriously impaired Dr. Carr's health. Seeing that the time was not distant when relief from his labors would be imperative, and that a retreat, assuring him quiet and rest, would then be

welcome, he purchased the barren acres now constituting Carmelita, his home at Passadena, where he now resides.

In the spring of 1877, the forty acres now comprising the home of Dr. Carr had never been touched by plow. Walking about the perfect grounds to-day, it is difficult to be persuaded that six years have been sufficient to produce forest and fruit trees of such magnitude, and that the transformation has been effected chiefly by the taste, industry and wise management of Mrs. Carr, who is a native of Castleton, Vt.

Dr. Carr is the author of published papers on many important subjects. Among them are: "Child Culture," "The Genesis of Crime," "Claims and Conditions of Industrial Education," etc., etc. A volume on "Agriculture" has received most favorable notice on both sides of the Atlantic.

During his residence in Vermont Dr. Carr was active in State affairs. As a member of the State Board of Education he was influential in sending many able teachers to the Southern and Western States. In 1846 he was elected president of the State Temperance Society, and was chosen a delegate to the World's Temperance Convention, held in London that year. He served for a time in the State Legislature, where he urged generous provisions for education, and other worthy measures. Dr. Carr has served the National Medical Association, as vice president, and has been a member of the American Association for the Advancement of Science, from its foundation. P. O. address, Passadena, Los Angeles county, Cal.

CHARLES E. CROSS, C. E., (Saratoga, N. Y.), was born in Ballston, N. Y., November 7th, 1818.

CHARLES S. FIELD, C. E., was born in Marlboro, Vt., February 5th, 1882.

EBEN NORTON HORSFORD, C. E., A. M., M. D., son of Jedediah and Charry M. (Norton) Horsford, was born in Moscow, Livingston county, N. Y., July 27th, 1818. Attended Temple Hill High School, Genesee, N. Y., and worked on his father's farm; was rodman and leveler on the New York and Erie railroad; made surveys from Painted Post to Dunkirk; took charge of parties on surveys for a railroad from Canandaigua to Rochester; assisted Professors Hall and Boyd on State geological survey from Mos-

cow along the Genesee river to Pennsylvania; studied drawing with March, of Rochester; entered the Institute in September, 1837, where he remained one year, graduating and then went to the Adirondack iron mines, remaining there six weeks, surveying the mines and fixing sites for dams; after making report in Albany, went into the survey of New York under Professor Hall, and was employed on the division west of Auburn for two years; assisted Dr. Emmons in his chemical lectures at the Albany Medical College in the winter; in 1840 entered the Albany Female Academy as teacher of sciences, remaining until 1844; during this time received a gold medal from the Young Men's Association for the best essay on mechanical powers; established the first daguerreotype gallery at Albany and Saratoga, in partnership with Thomas Cushman; in 1844 went to Germany to pass a couple of years in the study of chemistry, under Baron Liebig, at the University of Giessen, Hesse Darmstadt; returned in 1846, and was soon after appointed to the Rumford professorship in Harvard University; he organized the department of analytical chemistry in Harvard Scientific School, and held this professorship for sixteen years; a list of his publications may be found in the "American Chemist" for 1875; was one of the commissioners at the Exposition at Philadelphia in 1876; received the honorary degree of A. M. from Union College in 1840, A. M. from Harvard University in 1847, and M. D. from Castleton Medical College; member of the American Academy of Arts and Sciences, American Philosophical Society, American Association for the Advancement of Science, New England Historic Genealogical Society, and Historical Society of New Mexico; published a report on "Vienna Bread." Married, August 4th, 1847, Mary L. Gardiner, daughter of Samuel S. Gardiner, who died in 1856. Four children. July 22d, 1858, married her sister, Phoebe D. Gardiner. One daughter. He has taken out numerous patents covering inventions, under many of which manufactories have been instituted, principally the Rumford Chemical Works, Providence, R. I. P. O. address, 27 Cragie street, Cambridge, Mass.

Jerome Bonaparte Howard, C. E., son of Nathan and Beersheba (Rose) Howard, was born at Stephentown, Rensselaer county, N. Y., May 14th, 1819. Entered the Institute in 1836.

After leaving the Institute he was engaged as teacher of rhetoric and drawing in the State Normal School at Albany, N. Y. In 1849 he went to California, where he remained some years, engaged in mining and also doing editorial work upon the daily paper at Marysville, and painting portraits. Returning from California, he located in Toledo, Ohio, where he opened a studio. and while engaged in art work he was also employed upon the daily paper. While he was teaching in the State Normal School he originated the "word system," and issued a little work called "The Child's First Book." This book was largely introduced and used in the public schools of New York, Pennsylvania and Ohio. He was twice married. Date of second marriage, May 14th, 1859, to Elmira A. Young, daughter of D. H. Young. Three children. February 20th, 1864, he enlisted in Company C, One Hundred and Twenty-third Ohio Volunteers, and was in service a little over three months, when he was captured by Moseby's Guerrillas, on May 30th, and died on the 17th of the following October, at Andersonville, Ga.

DAVID KENDALL, C. E., (New Lebanon, N. Y.), was born in Oxford, Mass., January 24th, 1816. He was well known all over the country as an extensive manufacturer of barometers and thermometers. Deceased.

WILLIAM GRAY LAPHAM, C. E., was born in Farmington, Ontario county, N. Y., March 23, 1816. He was a son of the late Judge John Lapham, and a brother of Hon. Elbridge G. Lapham of Canandaigua. The family is of Quaker descent. He received his preparatory education at the Canandaigua Academy. Stephen A. Douglass was his classmate and friend, and this latter relation was kept up as long as Douglass lived. After leaving the Academy, Mr. Lapham, to complete his education, entered the Institute, graduating with credit. After graduation he was for a time assistant in mathematics in the Institute. He assisted Professor Amos Eaton in the preparation of his well known "Manual of Botany for North America." Having made civil engineering his profession, he was first employed in that capacity in the construction of the Auburn and Rochester railroad, now a part of the "old road" to Rochester. Next he built, as chief engineer, the Canandaigua and Elmira railroad, now merged in the Northern Central, and, on its completion,

was made its superintendent, and continued in that capacity for several years. Upon the consolidation of the Elmira with the Canandaigua and Niagara Falls railroad, Mr. Lapham was made superintendent of the whole line from Niagara Falls to Elmira. He superintended these roads until the New York Central leased the Canandaigua and Niagara Falls road. In 1861 Mr. Lapham was appointed superintendent of the middle division of the New York Central, a post which he held through the successive administrations of Dean Richmond, Henry Keep and Commodore Vanderbilt, until his death. He died in September, 1873. He was more than once offered promotion, but his wife was an invalid for twenty years, and he preferred to remain in Syracuse, where he had made his home.

GEORGE BEMENT LENT, C. E., son of David Barbins and Alletta Gale (Bement) Lent, was born in Poughkeepsie, Dutchess county, N.Y., July 28th, 1819. Prepared for the Institute at Paltz Academy. He was engaged in the survey of the Central railroad at Painted Post, Bath, etc., N. Y. His life was much broken by ill-health. Was never in active business but a short time. For a number of years had a residence and farm at Fishkill; traveled extensively. Much of his life was passed in Poughkeepsie, and in real estate, in which he amassed a competency. Married, October 28, 1847, at Stanford, Dutchess county, N. Y., Catharine Bochee Carpenter, daughter of Judge Morgan Carpenter. She died at Poughkeepsie, September 16th, 1879. Had one child, a daughter, who died in infancy. George B. Lent died at Poughkeepsie, April 26, 1882.

EDWARD MYNDERSE, C. E., was born in Seneca Falls, N. Y., March 6th, 1816, where he has been engaged in business, and where he still resides.

ALLEN PEARCE, C. E., son of Allan and Gertrude (Becker) Pearce, was born at Trenton, N. J., August 26th, 1811. Prepared at Canandaigua Academy, residing at East Bloomfield, Ontario county, N. Y., and working a farm part of the time. He taught school, and became county superintendent of schools; entered the Institute in 1836, graduated in 1838, and then engaged in farming; removed from Bloomfield to Washington, D. C., in 1852, and had a clerkship in the land office; afterward moved

to Virginia, and again engaged in farming; was elected to the Legislature of Virginia in 1871, again in 1872, and died November 24th, 1873. He was justice of the peace from 1864 until his death. Married, November 13th, 1843, Harriet Eliza Hickok, daughter of Henry Pell Hickok, M. D. Two children; none living.

GEORGE PUTNAM, C. E., son of David and Betsey (Perkins) Putnam, was born at Harmar, in Marietta, Ohio, June 1st, 1817. Prepared in the schools of Marietta, and entered the Institute in 1838. Soon after graduation he settled on a farm of five hundred acres, near Athens, Ohio, which he cleared and cultivated, and devoted largely to sheep raising. He was a member of the County Agricultural Society. Married, September 10th, 1840, Susan Allen Westcott, daughter of Samuel Westcott. Seven children. He was killed on the railroad at Athens, Ohio, January 12th, 1876. He was great grandson of Gen. Israel Putnam of the Revolutionary war. "He was a man of sterling integrity, honest and upright, esteemed and respected as a citizen and christian, by all who knew him."

JOHN A. ROBISON, B. N. S., was born March 9th, 1821, in Schenectady, N. Y., and prepared for the Institute at the Academy in his native town. Not long after graduation went to Santiago, Cuba, and there practiced his profession as a constructing engineer. Deceased.

NORMAN STRATTON, C. E., son of Benjamin and Anna (Comstock) Stratton, was born at Stillwater, Saratoga county, N. Y., July 24th, 1820. He studied at home with a tutor, and afterward went to Waterford, N. Y., where he completed his studies before entering, in 1835. His first work after graduating, in 1838, was the construction of the Albany and Schenectady railroad, of which he had entire charge. After that he spent some time in Hamilton county, N. Y., surveying for a road over the mountains, at which time he built several bridges. He lived in Troy N. Y., for some years as superintendent of the Troy and Schenectady railroad, after which he entered the Albany Law School. On relinquishing his legal training he did it with honor, and for seventeen years practiced law as a member of the New York bar with success. In 1867 he was elected a member of the State

Constitutional Convention, to revise the laws of the State of New York. In 1870 he was appointed civil engineer in the United States navy, and stationed at Brooklyn, which office he retained until his death, March 11th, 1882. As civil engineer his duties were important and laborious. He had the entire charge of all the buildings and docks, the gas and water works, keeping in repair all streets and buildings connected with the Brooklyn navy yard. He personally superintended the building of the large machine shop, which is very perfect in all its appointments. The rank of United States civil engineer was not settled until 1881. He at that time was given the rank of commander, and was entitled to all the honors due the rank. He was a frequent contributor to the scientific journals of this country. Married, November, 1846, Rebecca Marvin, daughter of Daniel Marvin, of Troy, N. Y. Three children; one living. Wife died March 17, 1855. In November, 1862, he married Miss Traphagen of New York city. He delivered the address at the semi-centennial celebration of the Institute in 1874.

ALBERT A. THOMPSON, B. N. S., was born in Troy, N. Y., September 17th, 1820.

STEPHEN TYLER WHIPPLE, C. E., was born in Cheshire, Mass., February 14th, 1816. He has engaged in manufacturing, and at one time in the manufacture of glass, at Berkshire, Mass. Afterward a manufacturer of furniture at Pittsfield, Mass., where he still resides.

CLASS OF 1839.

BENJAMIN W. BOURS, C. E., (Geneva, N. Y.), was born in New York city July 10th, 1818. For many years he has been engaged most successfully in the banking business at Stockton, Cal.

EDWARD BRINLEY, JR., B. N. S., C. E., was born at Perth Amboy, N. J., October 18th, 1821. After graduation he practiced his profession in his native place, and was made surveyor general of East New Jersey. Deceased.

GEORGE HAMMELL COOK, C. E., B. N. S., Ph. D., LL. D. *See Senior Professors, page 128.*

ELIHU W. COTES, C. E. He was for a time employed as engineer on the Black River canal, and afterward entered into partnership at Warren, Ohio, with J. H. Macomber, with whom he continued as a merchant till his death, which occurred in April, 1848. Married Eliza Hulbert, of Boonville, N. Y., daughter of Richard Hulbert.

GEORGE ROBERT DENNIS, B. N. S., M. D., son of John Upshur and Maria (Robertson) Dennis, was born at White Haven, Somerset county, Md., April 8th, 1822. Prepared at Washington Academy, and entered the Institute in 1838. After completing the Institute course, he entered the University of Virginia, and subsequently studied medicine at the University of Pennsylvania, receiving his degree of doctor of medicine from that institution in 1843. He entered upon the practice of his profession in 1844, at Kingston, Somerset county, Md., and continued through life. He was in both branches of the Legislature of Maryland, and afterward a Senator from Maryland in the Senate of the United States. He died August 13th, 1882.

HENRY J. DRAYTON, C. E., was born in Philadelphia, Penn., March 5th, 1819. After he was graduated, he practiced his profession of civil engineering for a number of years. He then went to Europe about 1845, where he married an English woman, an actress. On returning to this county he gave up his profession, engineering, and, with his wife, gave parlor plays, and acted in the smaller theatres. He met with only fair success in the northern cities, but was more successful in the South, where he spent most of his time until the close of the war, when he returned to England, and there died, about 1870. He was naturally very talented, had an unusually fine baritone voice, and often sang in concerts in Philadelphia, his native city. He visited Troy in 1860, and, with Mrs. Drayton, gave a series of performances, to crowded houses.

WILLIAM GURLEY, C. E., Troy, N. Y, *See Vice Presidents, page 48.*

STRICKLAND KNEASS, C. E., son of William Kneass, for many years surveyor for United States Mint, was born in Philadelphia, Penn., July 29th, 1821. His school education was obtained chiefly at the Classical Academy of J. P. Espy. Entered the

Institute in 1837, graduating in 1839. He was soon after made assistant engineer, and topographer on the State survey for a railroad between Harrisburg and Pittsburgh; afterward draughtsman in the bureau of naval engineering at Washington; was employed by the British Commission in preparing maps of the northeast boundary between the United States and the Provinces, and subsequently by the general government on a general map of the boundary survey; in 1847 he was selected by J. Edgar Thomson, chief engineer, as one of his assistants in the explorations which resulted in the construction of the Pennsylvania railroad, and afterward was promoted to the position of principal assistant engineer, and designed the first shop and engine house erected by the company, at Altoona. In 1853 he resigned to accept the position of associate engineer on the North Pennsylvania railroad, leaving, in 1855, to accept the office of chief engineer and surveyor of the city of Philadelphia, to which position he was re-elected three times, each for a term of five years. Under his surveys the entire drainage system of the city was provided for, and of the various bridges that span the Schuylkill, those at Callowhill and Chestnut street are from his designs. In 1862 he was sent to the interior, and made an extended survey of the Susquehanna river from Duncan's Island to Havre de Grace; assisted in preparing topographical maps of the surroundings of Philadelphia; he resigned the office of chief engineer March 6, 1872, to accept the position of assistant to J. E. Thomson, president of the Pennsylvania railroad company; in 1880 became president of the Belvidere Delaware railroad company, of the Trenton railroad company, of the Columbia and Port Deposit and Western railroad company, and a director of the Pittsburgh, Cincinnati and St. Louis line; member of the American Philosophical Society, of the Franklin Institute, and of the American Society of Civil Engineers. Married, in 1853, Margaretta, Sybilla, granddaughter of Hon. George Bryan, of the Supreme Court of Pennsylvania. Died January 14th, 1884.

JOHN VAN NESS PHILIP, B. N. S., son of Henry G. and Catherine D. (Hoffman) Philip, was born in Claverack, N. Y., March 15th, 1823. Attended Kinderhook Academy, and entered the Institute in 1838 or 1839. Entered the United States navy in

February, 1841, and served until June, 1857, on the coast of South America, California during the Mexican war, in the Mediterranean, and five years as assistant professor of mathematics at the Naval Aeademy, Md.; resigned in May, 1857, and lived in Claverack until the civil war; offered his services to the government after the fall of Fort Sumter; was ordered to the R. R. Cuyler as executive officer, on blockade duty in the gulf, off Mobile, etc. The vessel R. R. Cuyler was sent to Boston for repairs in August, 1862, then touching at Key West for coal, yellow fever broke out, especially among the officers; after the death of Captain F. Winslow she returned to New York. Lieutenant Commander J. V. N. Philip died on board the quarantine hospital ship Florence Nightingale, September 3d, 1862. Married, August 3d, 1852, Laura Johnson, daughter of Chancellor J. Johnson, of Maryland.

James Henry Post, C. E., son of James and Barbara (Staley) Post, was born at Glen, Montgomery county, N. Y., July 14, 1820. He entered upon his profession of civil engineer June 6th, 1838. on the Canajoharie and Catskill railroad, which was never completed. In December of the same year he entered the Institute, and graduated March 22d, 1839. His only other occupation was teaching. His health failing, he made a voyage in the summer of 1842, and died at sea September 14th, 1842.

George Clinton Potter, C. E., son of Restcome and Lucinda (Strong) Potter, was born at Glenville, Schenectady county, N. Y., June 25th, 1817. Entered upon the work of his profession about the year 1840, at Albany and Cohoes, on the Erie canal; on the Lachine canal, Canada; first city surveyor of San Francisco, Cal., grading and laying out the streets and filling in the bay; he went to California with the Argonauts in 1848, and settled in San Francisco, where he followed his profession; held the office of city surveyor of San Francisco for two terms, from 1862 to 1866, though in the meantime he became interested in Oakland real estate, with his brother, Charles Potter, and, on the death of his brother, became sole proprietor of a large tract of land, known as the Potter property, on a portion of which is located the postoffice building. Mr. Potter spent his summers in Oakland for several years, and on the expiration of his term of office, in 1866, he went to Oakland to reside permanently.

He was a man of strong character, noble impulses, correct habits, a warm heart, and a hand ever ready to assist in all charitable and benevolent enterprises, private as well as public. Married, in 1862, Almena Cheever of Boston, Mass. Four children; two living. He died at Oakland, Cal., August 31st, 1883.

WILLIAM J. POWELL, C. E., son of William and Elizabeth (Campbell) Powell, was born at Geneva, Ontario county, N. Y., July 7th, 1818. Prepared at Geneva Academy, and entered the Institute in 1838. Engaged in the spring of 1839 on the Erie canal enlargement at Port Jackson four years. Married, June 22, 1843, Sarah S. Cady, daughter of Gen. Jay Cady, then of Minaville, Montgomery county, N. Y. Two children. Wife died in June, 1866. Married February 26th, 1878, Mrs. Annie E. White, daughter of Rev. Joel Parker, D. D., of New York city.

ORRIN STEBBINS, C. E., B. N. S., (West Troy, N. Y.), was born in Hudson, N. Y., March 28th, 1822.

JAMES TILGHMAN, B. N. S., C. E., was born in Oxford, Queen Anne county, Md., June 18th, 1820.

PETER VAN RENSSELAER, B. N. S., C. E., (Stockport, N. Y.,) son of Henry P. and Jane (Ford) Van Rensselaer, was born in Claverack, Columbia county, N. Y., June 1st, 1818. He prepared for the Institute at the Claverack Academy. He intended to follow the profession of engineering, but at the time of graduation the demand for engineers was not great, and he decided to remain at home on the farm, and attend to other business in connection with it. In 1851 he moved to Albany, N. Y., and entered into the lumber trade, in which he has remained and is still engaged at the present time. Was married March 12th, 1856, to Lucy A. Truax, daughter of Peter S. Truax, of Stockport, N. Y. Three children. P. O. address, 191 North Pearl street, Albany, N. Y.

AUGUSTUS PLATT VAN SCHAICK, C. E., son of Gerard and Eliza (Platt) Van Schaick, was born at Watervliet, Albany county, N. Y., in 1822. Prepared under Prof. George E. Cook, at Lansingburgh, N. Y. Commenced practice of his profession in 1840, on the Troy and Schenectady railroad and Erie canal. Afterward was a grain dealer in Lansingburgh. He was the

author of many figurative pieces, descriptive, religious and humorous. His health failing, he went to Rio Janeiro, and died at sea, after starting on his return, September 10, 1847.

FRANCIS GARDNER WOODWARD, C. E., son of Israel and Diadama (Hall) Woodward, was born in Westmoreland, Cheshire county, N. H., August 1st, 1815. Prepared for the Institute in the public schools. Engaged in land surveying, and manufacturing rifles for the western fur trade, in Keene, N. H. He entered the Institute in 1839. Was in the Nashua and Lowell railroad shop, Nashua, Hinkley and Drury and Union Locomotive works, Boston, Eastern railroad shop, East Boston, Worcester and Nashua railroad shop, and patents, machinery and real estate, in Worcester, 1843 to 1884; between 1869 and 1884 operated chiefly in real estate in Worcester; served occasionally as juror in Boston and Worcester courts; elected a life member of the Worcester county Mechanics' Association. Married December 12th, 1843, Mary Phillips, daughter of Lieutenant Phillips. Five children. P. O. address, Worcester, Mass.

CLASS OF 1840.

CHARLES HARTSHORN ANTHONY, B. N. S., A. M., was born in Troy, Rensselaer county, N. Y., June 4th, 1812. He entered the Troy Academy, (now High School), graduating at the age of fifteen. Began lecturing upon geology and botany in the Troy Academy; principal of High School up to 1840; in 1840 went to Albany; in 1846 established the Albany Classical Institute; retired in 1866; received the honorary degree of A. M. from Middlebury College, Vt., 1849.; in 1876 published "This, Our Life," in Albany; endowed the chair of Pathological Anatomy in the Albany Medical College, $5,000, Memorial church, West Albany, $2,500, Anthony Memorial Scholarship, State street Presbyterian church, $3,000, Albany Hospital, $2,000, Albany City Missionary Society, $800, Troy Orphan Asylum, $500; Albany Orphan Asylum, $500, Methodist Sunday School Union, $500, Rensselaer street Mission Sunday School, $500, and others. Died in Albany, N. Y., May 21st, 1874.

CHARLES COLLINS, C. E., B. N. S., was born in Brunswick, Rensselaer county, N. Y., October 31st, 1812. For several years succeeding his graduation he was employed in engineering in various parts of New England, displaying a practical test of his ability, and laying the foundation of his future highly honored and useful career. Mr. Collins was for some time in charge of important work on the Boston and Albany railroad. In 1849 he received offers from Ohio, and soon after removed to Cleveland and its vicinity, where he was engaged in locating the Cleveland, Columbus and Cincinnati railroad. Shortly afterward he became assistant in the construction of the Cleveland, Painesville and Ashtabula road. Besides his early connection with the above mentioned roads, he was at one time in the employ of the Cleveland and Mahoning railroad company, and often received large offers from the Southern States to take charge of railroad construction and management, but he finally accepted the position of assistant engineer on the Cleveland, Painesville and Ashtabula road, afterward becoming its chief engineer.

On the consolidation of the Cleveland, Painesville and Ashtabula road with railroads east and west, Mr. Collins was elected chief engineer of the consolidated line and its branches, which office he retained until his death. While employed in the construction of the Cleveland, Painesville and Ashtabula road he became acquainted with and married the daughter of Edwin Harmon, (now deceased), of Ashtabula, Ohio, and was a devoted husband to her who will ever mourn his untimely death, and also a dear friend and adviser in all his family relations.

The character of the deceased possessed the essential elements of a true and noble life. It was formed through the cultivation of qualities of mind and heart which but few men possess, giving evidence of accurate judgment, high integrity, unswerving devotion to duty, and an earnest and vehement deprecation of dishonesty, deception, and betrayal of high official trusts conveyed in the gift of office by his fellow-beings; and to these shining attributes of character was added a broad and noble charity, which endeared him to all, especially to those whom he employed; being always ready to alleviate the condition of the unfortunate, and to lend a helping hand, and encouragement to a higher position of trust and worldly competence; also assist-

ing their spiritual welfare, by liberally contributing to the erection of chapels in the vicinity of workshops, and elsewhere, on the line of his road.

While in the full zenith of his well-earned success, there came news of the awful calamity of the 29th of September, 1876, at Ashtabula. The bridge of the Lake Shore road had broken down in a winter's night, occasioning a scene of horrible suffering and death. The relations of Mr. Collins to the ill-fated bridge have been accurately stated in evidence during the investigation. He did not design or build it. It was an experiment with which he was apparently not quite satisfied, but he apprehended no danger. It had stood the usual tests; it had borne up without developing weakness or flaw for ten years, and apparently had not suffered injury from use. It was his duty to inspect and protect it from deterioration by natural causes, and this he undoubtedly did with the same fidelity that he gave to every duty.

When the dreadful disaster happened Mr. Collins hurried to the scene a broken-hearted man. Day and night, almost without food or rest—for he could neither eat or sleep—he labored in the snow and ice to recover what the wreck had left of wounded and dead, and to repair the damage to the road. Although not held responsible for the disaster, it oppressed him with a mountain weight that he could not shake off. The scenes of that awful night preyed upon his sensitive nature, and drove him, day by day, nearer to that condition in which the mind breaks down utterly, and moral responsibility ends.

He had appeared very despondent previous to and immediately succeeding the examination, and had been missing since the day following. It is supposed that instead of going to Ashtabula to join his family, who were visiting there, he repaired to his house, and fell to brooding over the terrible affair. He had passed the ordeal of the examination by the coroner and the Legislative committee with great satisfaction to all his friends, the members of the Legislative committee entirely exonerating him in private. But he was unable to withstand fears that the general public would not so decide. The suicidal deed was evidently committed on Thursday, January 19th, 1877, the day succeeding the examination.

EDWARD NATHAN DAUCHY, C. E., (Amsterdam, N. Y.), son of Burr and Maria (Lefferts) Dauchy, was born in Galway, Saratoga county, N. Y., July 26th, 1822. Prepared at the Amsterdam Academy. Merchant in Amsterdam, N. Y., 1841 to 1846; merchant in Troy, N. Y., 1847 to 1865. Married, August 25th, 1842, Marion Reid Pardee, the daughter of Captain Hiram Pardee, U. S. A. Four children. Wife died June 2d, 1871. Married Harriet W. Borst, daughter of Peter Borst. P. O. address, Troy, N. Y.

ANSON DURHAM, C. E., was born at Easton, Washington county, N. Y., March 24th, 1820. After graduation was engaged in a hardware store at Greenwich, Washington county, four years; since then engaged in agricultural pursuits; justice of the peace since 1864. Married, December 4th, 1846. Four children; three now living. P. O. address, Galesville, Washington county, N. Y.

ABEL NATHANIEL HASKIN, B. N. S., C. E., son of Joseph and Suviah (Bosworth) Haskin, was born at Pittstown, Rensselaer county, N. Y., January 21st, 1820. Was in the cotton manufacturing business in Pittstown, N. Y., previous to 1852, when in company with L. W. Haskin, under the firm name of Haskin Brothers, the business was continued in Battenville, Washington county, N. Y., until 1869. The following year he removed to Petersburg, Va., where he is now living. Married, in 1862, Charlotte F. Weed, daughter of James Weed, of Rupert, Vt. P. O. address, Petersburg, Va.

ALFRED B. HASKIN, B. N. S., C. E., son of Joseph and Suviah (Bosworth) Haskin, was born at Pittstown, Rensselaer county, N. Y., May 21st, 1818. Was for a number of years engaged in the cotton manufacturing business at Pittstown, N. Y., but failing health compelled him to retire. He died in December, 1879, at the residence of his brother, A. N. Haskin, Petersburg, Va.

WILLIAM LEWIS, C. E., B. N. S., M. D., was born in Prattsburgh, Steuben county, N. Y., June 5th, 1820. After graduation he studied medicine, but died soon after entering upon the practice.

AUSTIN FORD PARK, C. E., B. N. S., A. M., son of Addison and Welthia (Ford) Park, was born in Canaan, Columbia county, N. Y., May 11th, 1825. Educated in the common schools, and the Columbia Boarding School, Chatham, N. Y. Entered the Institute in May, 1840, and September 24th, 1840, received a certificate signed by Professor Amos Eaton that he was that day passed as well qualified for the degree of C. E., but was not old enough to answer the law; continued a student of engineering, astronomy, etc., until March, 1841, when he received said degree; continued as a student of chemistry, geology, botany and natural history through the summer terms of 1841 and 1842, and as a free student and assistant through the winter terms of three years; in 1843 and 1844 was engaged in various work of engineering and surveying in and about Troy; in March, 1845, received the Institute degree of A. M.; in May, 1845, commenced work for Phelps & Gurley, (predecessors of Messrs. W. & L. E, Gurley), Troy, N. Y., making mathematical and philosophical instruments, and continued at that work, and making telegraph instruments, until 1854; invented and patented several telegraph instruments; in 1855, commenced the business of solicitor of patents, and has continued the practice of that profession to the present date; commissioner of deeds for Troy, N. Y., many years; captain of Co. G., Twenty-fourth regiment, N. G., S. N. Y., from December, 1869, to March, 1873; member of the Troy Scientific Association. Married, November 29th, 1854, Caroline Esther Wood, daughter of Aaron Wood, of Troy. No children living. Engaged in study of ornithology; has prepared a scientific collection of mounted birds, (340), including nearly all the species of North America. P. O. address, Troy, N. Y.

SAMUEL BURT PARSONS, C. E., was born in Colebrook, Coos county, N. H., September 1st, 1820.

GEORGE HENRY STARBUCK, C. E., son of Nathaniel and Merreb (Bunker) Starbuck, was born in Troy, March 19th, 1822. Graduated at the Institute in the class of 1840. Succeeded his father in the business of the manufacture of steam engines, boilers and machinery, and was thus engaged for about thirty years. He was appointed by President Arthur supervising inspector of steam vessels for the second district of the United

States, which embraces the waters of the Atlantic coast, and its tributaries from Passamaquoddy Bay to Cape Charles, and is fulfilling the duties of that office at the present time. His office is in the postoffice building, No. 120, New York city.

WILLIAM GRANDIN VOUGHT, C. E., B. N. S., son of Abram and Ruth (Voorhees) Vought, was born at Duanesburg, Schenectady county, N. Y., February 16th, 1821. His tastes were purely intellectual, and he would have chosen such paths in life as led that way. But his father had other plans for him, and he relinquished, or laid down for a while, as he hoped, such desires, to enter upon the drudgery of business, and took what first came under his hand, and which gave him time for reading, some study and the pursuits he was fond of. In the autumn of 1845 he was induced to enter upon the business of a large flouring mill, which only lasted a little while. He died in 1846, having won already the respect and confidence of some of the best men in Western New York. He had inherited rare qualities for social life, which, added to a fine education for so young a man, made him an especial favorite, and won him friends. He was very fond of recalling his life at the Institute, as well as his tramps over the hills with his classmates.

GURDON BUCK WALLACE, C. E., son of Uriah and Julia (Wright) Wallace, was born in Troy, N. Y., November 19th, 1824. After graduation he engaged in the mercantile business in Troy, N. Y., until 1875, since which time he has resided in the country, near Albany, N. Y. He married Cornelia M. Low, daughter of the late Peter Low, of Troy, N. Y. Five children. P. O. address, Albany, N. Y.

JOHN HENRY WHITE, C. E,, was born at Chesterfield, Cheshire county, N. H. After graduation followed the occupation of merchant, and entered upon the practice of the law in 1846. Member of assembly from the city of New York, 1850 and 1870; commissioner of the board of education, 1851 and 1852; city attorney, 1874, and in the following year declined the nomination for judge of the superior court. Married, July 16th, 1850. Four children. He died in New York city February 27th, 1875.

CLASS OF 1841.

JOSEPH RICHARD BRADWAY, C. E., B. N. S., son of Benoni and Althea W. (Vanderveer) Bradway, was born in Carlisle, Schoharie county, N. Y., June 5th, 1818. Prepared at the Schoharie Academy, Schoharie Court House, and at the Gallupville Academy, Gallupville. Taught district school and surveyed; entered the Institute in the winter term of 1840. He taught district school in the winters of 1841 and 1842, in Florida, Montgomery county, N. Y.; in May, 1842, removed to Delavan, Walworth county, Wis., where he pursued the study of practical botany, in connection with medicine, and taught a select school; attended lectures at Rush Medical College, and graduated February 16th, 1847; practiced medicine in Delavan, Wis., until 1853, when he removed to Red Bluff, Cal,, where he continued to practice until November, 1872, when he went to Oakland, Cal., where he has continued in practice until the present time; was appointed surgeon of volunteers in 1863, serving with a detachment in the Indian service in California, Lieutenant L. H. Elliott commanding; received the rank of surgeon, with rank of major, in the Fifth Brigade, C. M. General John Bidwell commanding, commission dated October, 1863; elected superintendent of public instruction in Walworth county, Wis., in 1846; appointed superintendent of Deaf and Dumb Asylum, Delavan, Wis., in 1852; elected to the office of county superintendent of public instruction in Tehama county, Cal., in 1856; appointed postmaster at Red Bluffs, Cal., in 1862, and held the office till 1871; elected health officer and city physician of Oakland, Cal., in 1882; elected a member of the California Academy of Natural Sciences in 1858, California State Medical Society, 1865, Alameda County Medical Society, 1872, and Oakland Library and Pathological Society, 1881; wrote a paper on "The Water Supply of Oakland," published in 1882 in Oakland, "Rambling Thoughts on Poets and Poetry." written in 1884 and 1885, and now being published in San Francisco, by A. T. Dewey. Married December 16th, 1847, Elvira Irish, daughter of Joseph E. Irish. Two adopted children. P. O. address, Oakland, California; Broadway, No. 1003½.

ELBRIDGE GERRY BUSWELL, C. E., M. D., son of John G. and Mary (Spear) Buswell, was born in Troy, N. Y., July 14th, 1820. Prepared for the Institute in the public schools. After leaving the Institute studied medicine with the late Dr. Julius Skilton, of Troy, and continued its practice through life. He married Mary Sisson, by whom he had three children. He died at Northampton, Mass., December 10th, 1884, and his remains were brought to Troy, and placed in Oakwood Cemetery. He is survived by two children, a son and a daughter. The former, Elbridge G. Buswell, Jr., is a resident of Oakland, Cal.

NATHAN COTTRELL, 2D., C. E., was born in Hoosick, N. Y., January 21st, 1823. Graduated from the Institute in 1841. His occupation was that of a farmer. Married, January 7th, 1846. Five children. He died October 5th, 1873.

JOEL BENEDICT HARRIS, C. E., (Plainfield, Conn.) was born at Sterling, Conn., November 5th, 1822. He entered the Institute in 1840. Followed the profession of civil engineering, 1842 to 1853; railroad contracting, 1853 to 1860; foundry and car wheel works, at Rutland, Vt., since 1860; grading, masonry, bridging and track laying on New York, New Haven and Springfield railroad, Boston and Albany railroad, Harlem and other railroads. Married, December 30th, 1847. Three children. Married, November 24th, 1864. Five children. P. O. address, Rutland, Vt.

LEONARD W. HASKIN, C. E., son of Joseph and Suviah (Bosworth) Haskin, was born at Pittstown, Rensselaer county, N. Y., May 31, 1825. Prepared at the Troy Academy. Was engaged in the cotton manufacturing business in Pittstown, N. Y., under the firm name of J. Haskin & Sons, for several years prior to 1852; then formed a copartnership with A. N. Haskin, under the firm name of Haskin Brothers, and purchased the Phœnix cotton mills, at Battenville, Washington county, N. Y., where they continued the manufacture of various kinds of cotton and linen goods until the mill was destroyed by fire in 1869; in 1872 with others organized the Phœnix paper company; during the following year retired from active business on account of failing health; now located at Saratoga Springs, N.

Y., in the summer, and at Jacksonville, Fla., during the winter. Married, September 25th, 1851, Caroline Hyde, daughter of S. S. Hyde, of Pittstown, N. Y. Three children. P. O. address, Jacksonville, Fla.

CHARLES B. HYDE, C. E., son of Christopher and Hannah (Gilbert) Hyde, was born at Franklin, New London county, Conn., October 2d, 1816. Prepared at the Rensselaer Oswego Academy, Mexicoville, N. Y., and at Florence Academy, Oneida county, N. Y. Entered the Institute June 28th, 1841. In charge of the civil engineering class of the Institute during the summer of 1842; in 1843 teacher of mathematics in the Academy at Mexicoville, N. Y.; from 1844 to 1851, employed in teaching in different places; April 1st, 1851, rodman on Oswego canal in employ of the State, and continued on that work until April, 1858, when the office he then held (first assistant engineer) was abolished, the work being nearly completed; for the next two years was employed in looking after claims for land damages caused by the enlargement of the canal, and in surveys for land damage; on the Michigan Air Line railroad from 1867 to its completion in 1871; on various other railroads for shorter periods, the Michigan Central, Grand River Valley, Grand Trunk of Michigan, Chicago, Danville and Vincennes, etc.; civil engineer for city of Jackson, Mich., six years, last term ending in 1883. Member of Michigan Association of Surveyors and Engineers. Married August 10th, 1856, Ellen J. Newkirk, daughter of Nathan Newkirk. One child. P. O. Address, 213 Second St., Jackson, Jackson county, Mich.

DOUGLASS W. HYDE, C. E., son of Samuel S. and Sally Ann (Maxon) Hyde, was born at Pittstown, Rensselaer county, N. Y., October 5th, 1823. Attended Ballard's Seminary, at Bennington, Vt., in 1835 and 1836, and entered the Institute December 21, 1841. He was bred a farmer until he was twenty-six years of age; then engaged in the manufacture of sporting, blasting and government powder; for the next twenty years was superintendent of the Bennington powder works, and finished one ton per day of government powder for the United States Government, during about five year's time; since then has been engaged in mercantile and lumbering business in Bennington, Vt.; town superintendent of common schools in his native town for sev-

eral years, and postmaster for twelve years, at Pittstown, Rensselaer county, N. Y. Married, January 6th, 1858, Matilda A. Russell, daughter of the Hon. William Russell, of Pittstown, N. Y. P. O. address, Bennington, Vt.

JOSEPH HENRY JENNEY, C. E., son of John and Melita (Severance) Jenney, was born at New Braintree, Worcester county, Mass., June 29th, 1822. Prepared for the Institute in the common and high schools. Married, June 26th, 1882, Mrs. Sarah J. Cary; maiden name, Sarah J. Ranken. P. O. address, 361 Congress street, Troy, N. Y.

EDWARD ROOT KELLOGG, C. E., B. N. S., (Brooklyn, N. Y.), son of Edward and Esther Fenn (Warner) Kellogg, was born in New York city, January 26th, 1824. Never practiced his profession; was for several years a farmer in Tompkins county, N. Y.; afterwards engaged in the management of real estate in the vicinity of New York, having an office in that city. Married R. Jenette Fuller. Seven children. Four living. Wife died in 1871. He died October 1st, 1883.

NATHAN KELLOGG, C. E., (Malden, N. Y.), was born in Bristol, Ulster county, N. Y., February 18th, 1825. Has been engaged in brick manufacture and was a dealer in stone at Malden, N. Y., and also in New York city, where he now resides. P. O. address, 285 Broadway, New York city.

LOUIS LA COSTE, C. E., was born in Boucherville, District of Montreal, L. C., November 23, 1823.

SENECA HUNT MARLETT, B. N. S., C. E., Rotterdam, Schoharie county, N. Y., entered the Institute in 1841, and graduated in 1843. He went to California in the early days of the gold excitement. At one time he was civil and mining engineer at Gold Hill, Nevada; afterward in Virginia City. About 1865 he was elected surveyor general of Nevada, which position he held for some time. His last address known was Virginia City, Nevada.

SOLOMON VAN RENSSELAER MILLER, C. E., son of George and Catherine (Weatherwax) Miller, was born in Schaghticoke, Rensselaer county, N. Y., February 14th, 1816. He attended

select grammar school and the Union Village Academy, entering the Institute in 1840. In the winter of 1841 was engaged on the Troy and Schenectady railroad, eastern division, and kept up with his class; farm surveying for forty-three years in this section of the country; made the plan of the poor-house barn in 1877; commenced teaching when seventeen years old in a district school in the town of Schaghticoke, and taught eight years; during this time was collector of taxes, school inspector, school commissioner, town superintendent of schools, and worked on the farm at home with a grammar in his hat and Jensen's dictionary in his pocket; was supervisor in 1877; member of assembly in 1878; director and president of turnpike company; director and president of town insurance company; was appointed marshal to take the census, in his district, 1855; life member of Bible Society of Rensselaer county. Married, February 1st, 1849, Maria, daughter of Matthias Snyder, of Schaghticoke. One son. P. O. address, Reynolds Station, N. Y.

HENRY POMEROY, C. E., B. N. S., A. M., was born November 26th, 1823, at Rochester, N. Y. He was a graduate of Union College, class of 1843, from which he received the degree of A. M. He was for many years an engineer in active duty upon some important public works. For some time after his graduation from Union he was retained as instructor in that college, and was tutor from 1845 to 1846. He was then appointed a professor in Lawrence University, Wisconsin. During four years of the war he served as a faithful officer, (lieutenant-colonel and acting colonel), of a Wisconsin Volunteer Cavalry regiment. He was chosen professor of mathematics in Washington University, St. Louis, Mo., in 1870, which position he filled with marked ability until his resignation in 1875. He then occupied the position of principal of the High School in Chattanooga, Tenn., where he remained until his death, February 29th, 1876. The following is copied from a paper published by the students of Washington University, St. Louis: "Professor Pomeroy was a man of broad culture and the most liberal and progressive views. He brought to his work in all its variety of labor, a clear head, a sound judgment, and a mind remarkably well stored with facts. Few men who have devoted themselves to specialties, can be found of more extensive reading and information in

all branches of general literature. Thus his culture, his years of experience, and his good judgment gave to his advice, which was often sought by his associates, much more than ordinary value. During the last ten years of his life his work was frequently interrupted and oftentimes his very life made a burden to himself in consequence of an incurable disease contracted in the army. He was often heard to say that he felt that he had not more than ten days' lease of life. Yet he was uniformly cheerful, always ready to contribute his part to the social enjoyment of those with whom he associated. Naturally of a retiring and reserved disposition, he made few friends; but to those few he was a true and a generous companion, and to them he has left very many pleasant remembrances of delightful hours spent in social converse. To this University, during the five years of his stay here, ending June, 1875, he was ever a warm and earnest friend, exerting himself to the utmost of his ability, within and without its walls, for its sound growth and prosperity. As a Faculty, as Students, as a University, we cannot but feel a sense of personal loss. To his bereaved family we extend our most heartfelt sympathy, and assure them that his name will ever be remembered by us with respect and esteem."

LODOWICK STANTON, JR., C. E., son of Lodowick and Catharine (Ryan) Stanton, was born July 27th, 1821. Prepared for the Institute at the Jonesville Academy, Saratoga county, N. Y. After graduation he taught school in Pittstown, Rensselaer county, one year, and then went to Detroit, Mich., where he taught in the public schools for several years. He afterward moved to Freeport, Ill, and there, and in other states, followed his profession of railroad engineering. He lived in Freeport until his death, June 8th, 1883. He married while living in Detroit. Six children.

GEORGE TIBBITS, C. E., A. M., son of George Mortimer and Sarah (Bleecker) Tibbits, was born April 12th, 1825, at the old Tibbits mansion, now known as the Day Home, situated at the head of Congress street, Troy, Rensselaer county, N. Y. After receiving instruction at the primary schools of this city, his education was continued at the Collegiate Institute of Professor Charles Bartlett, at Poughkeepsie, N. Y. During this period he attended a course of instruction at the Institute, and received

the degree of C. E., as a member of the class of 1841, at the early age of sixteen. He then entered the sophomore class at Union College, in 1842, where he was graduated in the class of 1845 On leaving college he commenced the study of the law, in the law office of Job Pierson, Troy, Rensselaer county, N. Y., and was admitted a member of the bar on the completion of his studies, but never engaged in the active practice of his profession. Business engagements subsequently led him to remove to Milwaukee, Wis., where he remained for two or three years. In 1851 he went to Europe, and was absent about a year. After his return he for many years devoted much time and attention to the maturing of plans for ensuring the gradual growth of the commercial capabilities of the lands surrounding the Hudson river in the vicinity of Troy, N. Y. His attention was more particularly directed to the development of certain property interests on Green Island, opposite the city, which were in his charge, and mainly through his instrumentality a system of docks was arranged and docks were constructed at the lower point of the island, so as to take advantage of the fact of the junction near that point of the Hudson river with the Erie and Champlain canals. The result of this enterprise was to increase the prosperity and value of property on Green Island. He also had the charge of real estate in Albany and Utica, N. Y., which he managed in such wise as to manifest the results of discretion and an appreciation of the times. Although having a wide acquaintance with public men, he rarely allowed himself to appear before the public as a candidate for office. He represented the second ward of Troy in the common council from 1858 to 1861, and while there was ever alive and watchful for the interests of the city.

He was a war Democrat during the late rebellion, and took a deep interest in forwarding the efforts of the lovers of the Union, to uphold the government. For many years he was a sufferer from neuralgic affections of the most severe character, and, about four years previous to his death, by a fall, he lost the entire use of one of his legs. A naturally cheerful and uncomplaining disposition, to which for a long time previous to his death were added the consolations of a religious hope and faith, enabled him to bear the ills with which he was so sorely afflicted, with patience and resignation. Bountifully endowed

both physically and mentally with very great capabilities, had the "chances and changes" of this life been as favorable to him as his endowments were great, the influence of his capacities would have been felt and appreciated in an ever widening extent. His devotion to the interests of Troy and to the develment of all its vicinage as a centre of trade, was unceasing, and while his friends mourn his loss as a friend, Troy mourns his loss as the departure of one who was ever zealous and watchful for her good. He died March 4th, 1875.

ROBERT H. VAN BERGEN, A. M., C. E., son of Anthony M. and Maria (Van Den Berg) Van Bergen, was born at Coxsackie, Greene county, N. Y., April 14th, 1820. Graduated from Union College in 1840, and entered the Institute in 1841. Has been engaged in civil engineering and surveying in various places since 1845; received the degree of A. M. from Union college. Married, February 23d, 1848, Catherine E. Van Den Berg, daughter of Henry M. Van Den Berg. P. O. address, Coxsackie, Greene county, N. Y.

CLASS OF 1842.

REED BROCKWAY BONTECOU, B. N. S., M. D., son of Peter and Semantha (Brockway) Bontecou, was born in Troy, N. Y., April 22d, 1824. He attended the Lancasterian School, of Troy, N. Y., Poultney Academy, Vt., and Charles Anthony's Troy Academy. Entered the Institute in 1840. He devoted himself to the study of medicine during 1843, 1844 and 1845, in Troy and New York city, and passed the year 1846 in a voyage up the Amazon River, Brazil, in the interests of natural science. Commenced the practice of medicine and surgery in 1847 at Troy, N. Y., and has continued the same to the present time, with the exception of five years and a half as surgeon of volunteers in the late War of the Rebellion. Was coroner of Rensselaer county and examining surgeon for pensions; member of the Rensselaer County Medical Society, New York State Medical Society, American Medical Association, American Surgical Association, American Association for the Advancement of Science, the Troy Lyceum of Natural History, and New York State Medical Association. In 1886 appointed one of the Council of Military

and Naval Surgery of the International Medical Congress. Married July 18th, 1849, Susan Northrup, daughter of Moses Northrup. Six children. The first United States army general hospital organized in the late war (Hygenia United States Army General Hospital, Fort Monroe, Va.) was under his charge from September, 1861, to September, 1862. He took part in the battle of Big Bethel; was present at the fight of the Monitor and Merrimac, and at the capture of Yorktown; was chief medical officer of the general hospitals at Beaufort, S. C., and took part in the iron clad attack on Sumter and the siege of Charleston, S. C., and was in command of the hospital steamer Cosmopolitan during that time. In October, 1863, he was placed in command of Harewood United States Army General Hospital, of 3,000 beds, at Washington, D. C., and remained in command until its destruction in 1866. He took part in the defense of Washington in 1865. Was repeatedly placed upon boards of investigation by the Surgeon-General, United States Army, and was the largest contributor to the "Medical and Surgical History of the War of the Rebellion." P. O. address, Troy, N. Y.

DAVID COLLIN, JR., C. E., B. N. S., son of David and Anna (Smith) Collin, was born in Fayetteville, town of Manlius, Onondaga county, N. Y., August 13d, 1822. He prepared for the Institute at the Fayetteville Academy, and entered the Institute in 1842. In 1844 he commenced farming, and has followed it since. For several years was engaged in the lumber trade. He assisted in organizing a state bank in Fayetteville, and has for a number of years been vice-president of the same. Married October 22d, 1845, Clara Park, daughter of Avery Park, of Burlington, Otsego county, N. Y. Wife died March 13th, 1881. Nine children. Was for several years director in the County Agricultural Society; also of the Manlius and Pompey Agricultural and Mechanical Association, and president of the same. P. O. address, Fayetteville, Onondaga county, N. Y.

HENRY WILLIAMS DANFORTH, C. E., son of Benjamin and Tryphena (Bates) Danforth, was born in Troy, Rensselaer county, N. Y., January 14th, 1823. He attended the North Troy and Lansingburgh district school and private school of

Miss Johnson, also school of Wm. Healy, a Quaker preacher; afterward district schools of Northumberland, Saratoga county, N. Y. He entered the Institute in 1842. Was farm and village surveyor at Mechanicville, 1846 to 1852; shipper and superintendent of Merchant Mill at Rensselaer Iron Works from 1860 to the fall of 1865; Albany & Rensselaer Iron and Steel Company from 1878 until the present time. He is now acting as time-keeper at the latter works. Was school commissioner of the Second Ward, Troy, N. Y., from the fall of 1865 to the spring of 1872, and assistant assessor of United States internal revenue from the fall of 1865 to the time of abolishing the office in 1873. Married January 24th, 1844, Maria Peck, daughter of John Peck. Six children. Before entering the Institute he taught district schools for two or three winters. Was first engaged in teaching about a mile east of the village of Stillwater, in the town of Schaghticoke, early in the autumn of 1839. P. O. address, Troy, N. Y.

BENJAMIN FRANKLIN GREENE, C. E., B. N. S., A. M. *See Directors, page 129.*

FITZ EDWARD HALL, C. E., M. A., D. C. L. Oxon., the eldest son of Daniel Hall, was born in Troy, N. Y., March 21st, 1825. After passing through various schools in his native place, with others at Walpole, N. H., and Poughkeepsie, N. Y., he became a member of the Institute, where he received the degree of civil engineer in 1842. The same year he entered Harvard College, with which he was connected till 1846. As a school boy and collegian Mr. Hall divided his attention pretty impartially among languages, mathematics and the natural sciences. In the spring of 1846 he sailed in a merchant-vessel from Boston for Calcutta, and on reaching the latter city, he availed himself of letters of introduction to Bishop Daniel Wilson and others, which had been given to him by the Hon. Edward Everett, and was consequently in no want of society. His original purpose of almost immediately returning to America was frustrated by the loss of his ship, and his enforced detention at Calcutta left considerable leisure time at his disposal. Without the least thought of becoming an Orientalist, he was induced by a few lessons in Hindustani and Persian to resolve on exploring, at least, those languages with some thoroughness. At Calcutta

he remained nearly three years, assiduously prosecuting his new studies, to which he soon added Bengalee and Sanskrit. His next place of residence was Ghazeepore, on the upper Ganges, from which place, after a sojourn of about five months, he removed to Benares on January 16th, 1850. Only a month later he was appointed, wholly without any solicitation of his own, to a post in the Benares Government College, a post which, in 1853, was converted into a professorship. In July, 1855, he was transferred to Ajmere as inspector of schools for Ajmere and Mairwara, together with the superintendentship of the Ajmere Government School. Again promoted, his next and last appointment in India was that of inspector of schools for the Saugor and Nerbudda territories, which he assumed at Saugor in December, 1856, and retained till the spring of 1862. In this interval he was absent from India about one year and a half, which he spent partly in England and France and partly in the United States. In 1860 he was honored with the degree of D. C. L. by the University of Oxford. From November, 1862, Mr. Hall lived for several years in London, where he was professor of the Sanskrit language and literature and of Indian jurisprudence in King's College, and also filled other offices. In 1869 he removed to Marlesford, Suffolk, his present place of abode. He still holds, in connection with the civil service commissioner, the examinerships in Hindustani and Hinde to which he was appointed in 1864, and an examinership in English has recently been added to them. He married in 1854, at Delhi, a daughter of the late Lieut.-Col. Arthur Shuldham. Of his five children, two survive. P. O. address, Marlesford, Wickham Market, England.

Aaron Ladner Lindsley, C. E., B. N. S., A. M., D. D., (Troy, N. Y.,) son of Aaron and Dorcas (Taylor) Lindsley, was born in Troy, Rensselaer county, N. Y., March 4th, 1818. Was prepared for the Institute at Marion College, and entered in 1839. In 1842 he entered Union Theological Seminary, New York; in 1844 Theological Seminary, Princeton, N. J., and in 1846 entered upon the profession of a clergyman. Was at Waukesha, Wis., six years; South Salem, N. Y., sixteen years; Portland, Oregon, sixteen years. Was principal of Institute, South Salem, N. Y., 1856; designed and built church of limestone rock at

Waukesha, Wis. He received the degree of A. M. from Union College, and D. D. from the University of the City of New York. Published "Sketches of an Excursion to Southern Alaska," and occasional sermons. Married May 12th, 1846, Julia West, daughter of John West. Eight children. Introduced schools and missions into Alaska. He organized the first American church in that territory, and built its house of worship. Two sons, Addison A. and George J., have been successful civil engineers on the Pacific coast, both having risen to command of parties in the field. P. O. address, Portland, Oregon.

JOHN MCCAUGHIN, C. E., (Shoreham, Vt.,) was born in Ireland, July 7th, 1818. He entered the Institute November 29th, 1841. After graduation he taught in Albany, N. Y.

IRA RICE PRATT, C. E., B. N. S., son of Ira and Rebecca (Turner) Pratt, was born at Bath, Steuben county, N. Y., January 10th, 1822. Prepared at Franklin Academy, Prattsburgh, N. Y., which was in charge of Rev. Flavel S. Gaylord. His parents died when he was quite young, and he was adopted by his uncle and aunt, Burrage and Anna P. Rice, of Prattsburgh. He was always delicate, and a cold taken while on a geological excursion with his class, after his graduation, developed into consumption, of which disease he died suddenly from a hemorhage, at his home, January 16th, 1843. His father, Ira Pratt, was a prosperous merchant in Bath at an early day. His grandfather, Capt. Joel Pratt, of Spencertown, N. Y., near the beginning of the century settled in Prattsburgh and gave the town its name.

JAMES WADE, JR., C. E., (Watervliet, N. Y.,) son of James and Sally (Mulford) Wade, was born in Niskayuna, Schenectady county, N. Y., January 28th, 1824. He attended school at the Schenectady Lyceum, the academy at Esperance, Schoharie county, N. Y., and the Jonesville Academy. In 1843 went to Cleveland, Ohio, and studied law. Was admitted to the bar in 1845, and went to Albany, N. Y. In 1846 he returned to Cleveland and commenced the practice of law, in which he still continues. Married July 14th, 1852, Margaret G. Uhl, daughter of John Uhl, of Newburg, N. Y. Five children; three living. P. O. address, Cleveland, Ohio.

CLASS OF 1843.

JAMES CAMPBELL, JR., B. N. S., (Pittstown, N. Y.,) son of James and Mary (Begley) Campbell, was born in Pittstown, Rensselaer county, N. Y., January 15th, 1822. Prepared for the Institute in the common schools and the academy in Bennington, Vt. He taught school one year in Hyde Park, Dutchess county, N. Y., before entering the Institute. After leaving the Institute taught school in Hoosick Falls and Pittstown, N. Y.; then in Dayton, Ohio. Was principal of one of the public schools one year and a half; then elected principal of the public high school, and held the position about eight years. Was superintendent of the public schools nearly two years. He resigned to accept the presidency of a company engaged in the manufacture of oil from cannel coal in West Virginia, and was for several years engaged in this business; also manufacturer and dealer in linseed oil, varnishes, etc. Was member of the Board of School Examiners for the city of Dayton and county of Montgomery for eight years, from 1851 to 1859, and also served during 1876 and 1877 as a member of the Board of Education. Was first deputy in sheriff's office in Dayton; also a member of the city council. Made and used several improvements in the treatment of coal oil. He has contributed to scientific journals. Was married June 30th, 1851, to Harriet A., daughter of Jonathan Chatterton. Three children. P. O. address, Dayton, Ohio.

CLARKSON NOTT POTTER, A. M., C. E., LL. D., (Schenectady, N. Y.,) was born in Schenectady, N. Y., in 1825; graduated at Union College (of which his grandfather, Rev. Eliphalet Nott, was president, and his father, Bishop Alonzo Potter, was vice-president,) in 1842. After graduation at the Institute, he was a surveyor in Wisconsin; studied law in that State, and after coming to the bar commenced the practice of his profession in New York city in 1847; held no public offices, but was engaged in many important cases; was elected to the forty-first, forty-second and forty-third Congresses. He died in New York city, after a short and severe illness, January 23d, 1882, and at that time was president of the association of graduates. It will be remembered the first re-union of graduates held in New

York city, was at the very hospitable residence of Mr. Potter, at Gramercy Park, on Friday evening, February 18th, 1881. About one hundred graduates were present, and quite a large number of distinguished engineers and scientists. He was tutor in Union College 1845–47, and trustee of the same institution from 1863 until the time of his death.

THOMAS BEVERIDGE SMALL, B. N. S., C. E., M. D., son of Edward Small, was born at Cambridge, Washington county, N. Y., May 21st, 1824. He prepared at the Cambridge, Washington county, Academy, and entered the Institute April 13th, 1843. He never practiced this profession, but studied medicine in the New York University. After graduation there he went through Germany, Switzerland and France, stopping at the most prominent hospitals of each country, and studying the various methods of each. His particular study was surgery, and he finally became an interne in one of the hospitals in Paris, spending some time there. He then came home and settled in Schaghticoke, Rensselaer county, N. Y. He had been there but a short time, and was fast gaining a reputation as a surgeon when he became infected with the "gold fever" in 1849, and joined a mining party from the above-named town, as the surgeon of the party. They proceeded westward, and in some one of the territories just east of the Rocky Mountains he was taken sick and lived but a few hours. He was buried there.

CLASS OF 1844.

JOHN HENRY BRODT, C. E., B. N. S., A. M., son of John Ingold and Jemima (Reeve) Brodt, was born at Troy, N. Y., June 2d, 1827; prepared at Williams College, and entered the Institute, November 1st, 1843. He was pastor of several churches in California between 1860 and 1870, and at Salem, Washington county, N. Y., and Williamsburgh, N. Y., at later dates. Married in California, Ellen Sears; nine children, six living. He died in September, 1875, at Dansville, Livingston county, N. Y., where his wife now resides.

The following notice of his life is taken from the Troy *Times:*
" The Rev. John Henry Brodt, a congregational divine of elo-

quence and ability, died at Dansville, September, 1875, of liver complaint. The reverend gentleman was born in this city forty-eight years ago, his father being John I. Brodt, of the firm of Brodt, Mallery & Co,, a well known mercantile firm. Deceased attended the Rensselaer Polytechnic Institute in this city, and afterwards graduated at Williams College. Soon after leaving college, he went to the Union Theological Seminary in New York, where he completed his studies for the ministry. In 1855 he was sent as a missionary to California, and remained there for ten years. He then took charge of a congregation in Salem, Washington county. He resigned and was appointed to the pastorate of the New England Congregational church in Brooklyn. He resigned his Brooklyn charge on account of ill-health, and subsequently took charge of a church at Dansville, N. Y. Mr. Brodt leaves a wife and six children. His father died when quite young, and his mother married Levinus Vanderheyden of this city. The deceased was a gentleman of fine culture, very social in all his relations, and was honored and respected by all who knew him."

JONATHAN BENJAMIN RIDER, B. N. S., C. E., (Malden Bridge,) son of Jonathan and Marcy (Wilson) Rider, was born in Chatham, Columbia county, N. Y., September 4th, 1823. Attended school at Stillwater, Saratoga county, N. Y.; also at Nine Partners, Dutchess county, N. Y. Entered the Institute May 27th, 1844. Has practiced land surveying to a limited extent; held the office of supervisor from Chatham during 1864–65; has been postmaster, census enumerator, and for many years notary public; held the office, by appointment of the Supreme Court, of railroad commissioner for the town of Chatham since 1868. Received the degree of B. N. S. in 1844, and C. E. in 1846. Married, December 29th, 1847, to Mary A. Kirk, daughter of William Kirk; six children. P. O. address, Rider's Mills, Columbia county, N. Y.

GILBERT T. TAYLOR, C. E., B. N. S., son of Dr. Taylor, was born in Lansingburgh, N. Y., February 16th, 1828. His last address, given in Register, is, general freight agent on the Panama & Aspinwall Railroad, Panama, C. A.

CLASS OF 1845.

JOSEPH EDWIN CLARK, B. N. S., M. D., son of Benjamin and Polly (Stillman) Clark, was born at Petersburgh, Rensselaer county, N. Y., April 4th, 1823. Prepared with Benjamin Avery, a graduate of the Institute, and others, and entered in the spring of 1845. Graduated in medicine at the College of Physicians and Surgeons, New York, in 1849, and commenced practice in Oriskany, Oneida county, N. Y., the same year; removed March, 1852, to Brooklyn, N. Y., and has practiced medicine there ever since. Was attending physician at Long Island College Hospital for five or six years, and has been attending physician at St. Peter's Hospital, Brooklyn, N. Y., for nine years. Member of Kings County Medical Society and American Medical Association. Married, June 8th, 1851, Frances Perry, daughter of Abner Perry, of New Lebanon, Columbia county, N. Y.; three children, two living; wife died August 25th, 1861. Married, January 1st, 1872, Juliet Sherwood, daughter of Dr. Justus Sherwood, of Southport, Conn. P. O. address, No. 340 Clinton street, Brooklyn, N. Y.

LEWIS EPHRAIM GURLEY, C. E., A. B., son of Ephraim and Clarissa (Sharp) Gurley, was born in Troy, N. Y., December 30th, 1826. Prepared at private schools in Troy, and entered the Institute November 14th, 1842. Began to work at the manufacture of surveyors' instruments in 1845; entered into partnership with William Gurley in 1852, and has since been prosecuting the same. Was school-commissioner in Troy from 1859 to 1872. Received the degree of A. B. from Union College in 1851, at graduation. Member of the Troy Scientific Society. Editor of "Manual of Instruments for American Engineers and Surveyors;" first edition, 1855; twenty-fifth edition, 1884. Married, October 28th, 1858, Olive E., daughter of J. P. Barnes; four children; wife died July 30th, 1874. Married, August, 1878, A. Louise Brown, daughter of Rev. Wm. Brown; two children. P. O. address, Troy, N. Y.

STEPHEN EUSTACE HASKELL, B. N. S., C. E., (Troy, N. Y.,) son of John Chandler and Randilla (Whipple) Haskell, was born in Weathersfield, Windsor county, Vt., December 19th, 1824. Attended the academy at Ludlow, Vt., and Meriden, N. H. Taught

school in winter, and worked on a farm in summer, at Weathersfield, Vt. Entered the Institute September, 1844. Taught in an agricultural school at Poughkeepsie, N. Y., in 1845 and 1846. In 1847, he entered the employ of J. E. Whipple, manufacturer of oil cloths, at Lansingburgh, N. Y.; in 1851 was admitted as a partner, and so remained till his death, March 6th, 1860. Married, December 26th, 1854, Charlotte M. Eddy, daughter of Titus Eddy, of Troy, N. Y; two children.

GOODWIN LOWREY, C. E., B. N. S., (Westmoreland, N. Y.,) son of Daniel and Abigail Burr (Goodwin) Lowrey, was born in Sharon, Litchfield county, Conn., April 24th, 1826. Prepared at De Lancey Institute, Westmoreland, Oneida county, N. Y., and entered the Institute in the fall of 1843. Went into mercantile business in New York city in 1847, and was thus engaged there and in the west until he retired from active business in 1860. Removed to Wisconsin in 1862, and engaged in farming; continued in that until ill-health forced him to give up about the year 1878; since that time has been living at Pass Christian, Harrison county, Miss., engaged in fruit raising. Was a member of the Wisconsin Legislature from Iowa county, Wis., in 1868. Married, September 24th, 1864, to Heloise Gai, daughter of Pirue Francois Gai, Florence, Italy. P. O. address, Pass Christian, Harrison county, Miss.

THOMAS BENJAMIN RIDER, C. E., LL. B., son of Jonathan and Marcy (Wilson) Rider, was born in Chatham, Columbia county, N. Y., September 4th, 1823. Attended various select schools and Kinderhook Academy, entering the Institute December 4th, 1844. After leaving the Institute he taught in a planter's family on the Santee River, S. C., one winter, and then commenced the study of law, at Troy, N. Y., with the firm of Pierson & Waite. From this office went to Harvard College, and graduated in 1849. Was admitted to the bar, and practiced law in New York four years, then retiring to his farm. Received the degree of LL. B. from Harvard. Member of various associations connected with Harvard University. Married, in 1852, Lucretia Lefferts Morrell, daughter of John Morrell, of Brooklyn, N. Y.; seven children, six now living; wife died November 23d, 1883. P. O. address, Rider's Mills, Columbia county, N. Y.

JAMES AVERY SKILTON, B. N. S., LL. B., son of Dr. Avery Judd and Mary Augusta (Pardee) Skilton, was born at Troy, Rensselaer county, N. Y., January 13th, 1829. Prepared at Troy Academy and Troy Conference Academy, West Poultney, Vt., and entered the Institute in 1845. Read medicine, but never graduated at a medical college or regularly practiced. Took charge of his father's office and financial affairs, and drifted into a knowledge of law and its practice. Spent eight or nine years in the South, before the war, in railroad and transportation enterprises. After the war, went to Albany Law School, especially to study constitutional law, and prepare for service in reconstruction work South. Graduated and went South, then returned to New York and entered patent law practice, in which he is still engaged. Received the degree of Bachelor of Laws from Albany Law School. Married, January 14th, 1879, Agnes Sheppard, daughter of George G. Sheppard, late of Brooklyn, N. Y. Wife died April 3d, 1882. P. O. address, Boreel Building, 115 Broadway, New York city.

CLASS OF 1846.

JABEZ PARKHURST BLOSS, B. N. S., M. D., (Troy, N. Y.,) son of Dr. Richard and Gratia Putnam (Parkhurst) Bloss, was born at Bethel, Windsor county, Vt., January 15th, 1828. Attended the Troy Academy, and for three years previous was clerk in a wholesale store. Entered the Institute in April, 1844. Graduated from the College of Physicians and Surgeons, New York city, in March, 1854. Was first assistant engineer of the Great Western (now Boston & Albany) railroad during the years 1847 and 1848. Was a California argonaut of 1849, and a smuggler on the Spanish main in 1850 and 1851. Married, January 6th, 1858, Kate Van Schaick ; three children. P. O. address, Troy, N. Y.

SAMUEL SEWALL GREELEY, A. B., C. E., son of Samuel and Louisa (May) Greeley, was born in Boston, Suffolk county, Mass., October 11th, 1824. Attended academy at Groton, also at Framingham, Mass., and Harvard University. Entered the Institute September, 1845. Began the work of his profession in the Spring of 1846 ; was engaged in the construction of the

Boston Water Works for two years ; the Rutland & Burlington railroad for two years ; the Orange & Alexandria railroad for one year and a half ; in various railroad surveys and land surveying in Chicago for thirty years. Held the office of city surveyor of Chicago, 1855, 1857, 1859. Received the degree of A. B. from Harvard University in 1844. Is a member of the Western Society of Engineers. Married, June 20th, 1855, Annie Morris Larned, daughter of John Larned, of Providence, R. I. Four children. Married, Sept. 5th, 1866, Eliza May Wells, daughter of Thomas G. Wells, of Boston, Mass. Five children, four living, P. O. address, No. 60 Bellevue Place, Chicago, Ill.

WILLIAM HALL, C. E., B. N. S.. (Albany, N. Y.) son of English parents, was born in Hingham, Plymouth county, Mass., October 26th, 1826. He attended school in his native town until fourteen years of age. In the following spring he went to Albany, N. Y., remaining there two or three summers, assisting his brother, Prof. James Hall, in the work of the geological survey of the state of New York, and attended school two winters at Moscow, Livingston county, N. Y. He entered the Institute November 1st, 1845. After graduation, he accepted a position as assistant engineer on the Erie canal under the direction of Mr. Marsh, who was a division engineer at Rochester at that time. He next went South, and was engaged as an assistant engineer for the construction of one of the Mobile railroads, Alabama. He settled permanently in Mobile, and engaged in the business of buying and selling land, and as a civil engineer. Mr. Hall married in Mobile, and had one son, named William. Mr. Hall died at Mobile in 1863.

WILLIAM ARMSTRONG INGHAM, C. E., B. N. S., LL. B., (New Hope, Pa.,) son of Samuel D. and Deborah (Hall) Ingham, was born in Solebury, Bucks county, Pa., May 25th, 1827. Graduated at Princeton College in 1849. Studied law in Trenton, N. J., and Norristown, Pa., and practiced in Philadelphia from 1855 to 1866. Was president of the Hazleton railroad in 1866, Tamaqua Coal company in 1868, Rock Hill Iron and Coal company, and East Broad Top railroad and coal company from 1872 to the present time. Was a commissioner of the second geological survey of Pennsylvania, in 1874 ; secretary of the board since 1877. Re-

ceived the honorary degree of A. M. from Princeton College. Member of the American Institute of Mining Engineers, American Philosophical Society, and the Engineers' Club of Philadelphia. P. O. address, 320 Walnut street, Philadelphia.

ALEXANDER MCPHERSON LESLEY, B. N. S., (Troy, N. Y.,) son of George and Caroline (Scott) Lesley, was born in Chazy, Clinton county, N. Y., December 4th, 1828. Prepared for the Institute at Troy Academy. Entered upon the work of his profession, May 1st, 1857, in New York city; is now engaged in manufacturing refrigerators and hot air furnaces. Married, December 19th, 1861, Mary Stevenson, daughter of Miles Stevenson, M. D.; seven children. P. O. address, 419 West 21st street, New York city.

JOHN EDWARD MAY, B. N. S., C. E., son of Rev. Samuel Joseph May. Prepared at English High School, Boston, Mass., and entered the Institute the spring term of 1846. Was a hardware merchant at Syracuse, N. Y., from time of graduation until April, 1858; commission merchant in New York city until April, 1868; since then, shipping and commission merchant in Boston, Mass. P. O. 57 Commercial Wharf, Boston, Mass.

JONATHAN RIDER POWELL, B. N. S., C. E., son of Henry J. and Judith (Rider) Powell, was born in Chatham, Columbia county, N. Y., February 2d, 1828 Received a common school education, with a brief course of instruction at the Friends' Boarding School, Washington, Dutchess county, N. Y. Resided at his birthplace, working on his father's farm summers and attended school winters; spent one winter in teaching district school. Entered the Institute in the fall of 1845, and graduated as civil engineer in 1846; returned in the fall of 1846, as assistant and had charge of the Institute during the interim of three months following the resignation of Prof. George H. Cook, and until his successor, Prof. B. Franklin Greene, was able to take his place. While assistant under Prof. Greene, he graduated in the department of natural science. Subsequently he took a course in analytical chemistry in the laboratory of Prof. James C. Booth, at Philadelphia, with special reference to the analysis of soils; while there he aided in the analyses of the specimens brought from the Holy Land (more particularly the Dead Sea

and vicinity,) by the United States Exploring Expedition under command of Lieut. Lynch. In 1848 and 1849 was professor of the natural sciences and agricultural chemistry at the Mt. Airy Agricultural Institute, Germantown, Pa. In 1850, he purchased the farm adjoining his birthplace, and has been engaged in farming in connection with land surveying, the greater part of the time since. In 1852, he was employed on the Albany & Susquehanna railroad on preliminary survey. 1871 to 1881 resided in Brooklyn, occupied as a broker. March, 1884, was elected supervisor of the town of Chatham, which office he still holds. Married, in 1850, to Miss Elizabeth A. Starks, of Troy, who died in 1853. Married again, in 1859, to Miss Anna Morrell, of Brooklyn, who died in 1868. Has three sons and one daughter. The eldest son is Rev. Henry A. Powell, pastor of Lee Avenue Congregational Church, Brooklyn, and one son is a practicing physician at Indianapolis, Ind.; the other two are minors. P. O. address, Old Chatham, Columbia county, N. Y.

JAMES A. PENFIELD, B. N. S., (Crown Point, N. Y.,) was born in Pittsford, Vt., January 31st, 1826. He entered the Institute May 6th, 1846. Has been engaged in the manufacture of iron, and as superintendent of the iron works near Crown Point, N. Y. P. O. address, 155 Charles street, Boston, Mass.

PERCIVAL ROBERTS, B. N. S., C. E., (Philadelphia, Pa.,) son of Algernon Sidney and Elizabeth (Cuthbert) Roberts, was born in Philadelphia, Philadelphia county, Penn., May 2d, 1830. His early education was received in the public school at Falls of Schuylkill, near Philadelphia. For five years attended Mount St. Mary's Roman Catholic College, near Emmettsburgh, Md.; one year at University of Pennsylvania, and three years at the Institute. In 1848, under S. W. Roberts, chief engineer, he assisted in making surveys for extension of Union Hill & Schuylkill Haven Railroad into Mahanoy Coal Basin. In the fall of the same year 1848, under S. W. Robert, chief engineer, he drove the first stake in Allegheny city for survey of the Ohio and Pennsylvania railroad, now Pittsburgh, Fort Wayne & Chicago railroad. He remained three years in the service of this company. In 1852 he started the Pencoyd Iron Works, on Schuylkill river, near Philadelphia, of which he

is now sole proprietor. Was connected with the first iron bridge building company in this country, built under the Whipple patents, which he purchased. Built the Beales wagon road bridges on the Illinois Central, Lehigh Valley, City of Philadelphia, Pensylvania, and numerous other railroads. Married, January 23d, 1856, Eleanor Williamson, daughter of Peter Williamson. Four children. P. O. address, 216 South Fourth street, Philadelphia, Penn.

JAMES HENRY SALISBURY, B. N. S., A. M., M. D., was born at Evergreen Terrace, Scott, Cortland county, N. Y., October 13th, 1823, and was the second son of Nathan and Lucretia A. (Babcock) Salisbury. He received his early education at the Homer Academy, Cortland county, N. Y., then presided over by the justly celebrated Prof. Samuel Woolworth, who was for many years, up to his recent death, secretary of the Board of Regents of the University of the State of New York. He received the degree of B. N. S. at the Institute in 1846, previous to which he had been appointed assistant under Prof. Ebenezer Emmons, in the chemical department of the geological survey of the State of New York, which place he filled until January 1st, 1849, when he was made principal, with his brother Charles B. as assistant, until 1852. Dr. Salisbury received the degree of M. D. from the Albany Medical College in January, 1850, and that of M. A. from Union College, Schenectady, N. Y., in August, 1852. He was elected a member of the American Association for the Advancement of Science in 1848, and the same year was also made a member of the Albany Institute. In 1853 he was elected corresponding member of the Natural History Society of Montreal. In 1878 he was chosen president of the Institute of Micrology, a position he continues to hold. In 1857 he was elected member of the American Antiquarian Society, and in 1876 was made vice-president of the Western Reserve Historical Society. In 1879 he was elected a member of Philosophical Society of Great Britain. In 1848 Dr. Salisbury received the prize gold medal from the Young Men's Association of Albany for the best essay on the "Anatomy and History of Plants." In 1849 he won the prize of $300, offered by the New York State Agricultural Society for the best essay on "The Chemical and Physiological Examinations of the Maize Plant, during the

various stages of its growth." This made a work of over two hundred pages, and was published in the New York State Agricultural Reports for 1849, and subsequently copied entire in the State Agricultural Reports of Ohio. In 1851 and 1852 he gave two courses of lectures on Elementary and Applied Chemistry in the New York State Normal School. He also conducted a series of experiments on different subjects, which were embodied in several papers read before the American Association for the Advancement of Science, in 1851, and were published in their transactions, and also in the New York *Journal of Medicine* of a later date. His list of published works numbers forty-six; of unpublished, twenty-one. The great labors of his life, comprising, as he claims, an explanation of the causes and successful treatment of nearly every chronic disease that is supposed to be incurable, are yet unpublished. In January, 1864, Dr. Salisbury went to Cleveland to assist in starting the Charity Hospital Medical College. He gave to this institution two courses of lectures, in 1864–65 and 1865–66, in physiology, histology and the microscope in disease. From January, 1864, to the present time he has been constantly engaged in treating chronic diseases, especially those which have hitherto been considered fatal, and his success in this field is widely known. He was married on the 26th of June, 1860, to Clara Brasee, daughter of Hon. John T. Brasee, of Lancaster, Ohio. Two children.

SAMUEL WILBOR SUTHERLAND, C. E., son of John and Maria (Wilbor) Sutherland, was born at Chatham, Columbia county, N. Y., May 28th, 1826. Prepared at Kinderhook Academy, and entered the Institute November 4th, 1845. He moved to Illinois, and engaged in farming near Bloomington, McLean county, in 1856. Married, December 26th, 1849, Mary H. Rider, daughter of D. W. Rider; two children. Died at Bloomington, Ill., May 18th, 1878.

ROBERT G. COOK, B. N. S., was born in Northfield, Mass., September 15th, 1827. Entered the Institute January 4th, 1846. P. O. address, Dalles, Oregon.

CHARLES DROWNE, C. E., B. N. S., A. M. *See Directors, page 129.*

RICHARD EDWARDS, Jr., B. N. S., C. E., LL. D., (Bridgewater, Mass.,) son of Richard and Ann (Jones) Edwards, was born in Lledrod, Cardiganshire, South Wales, December 23d, 1822. Came to the United States with his parents in 1833; settled in Portage county, Ohio; was employed in farming, and as a carpenter, until 1844. At that time he went to Massachusetts, and entered the State Normal School at Bridgewater. Entered the Institute May 5th, 1847. Was assistant teacher at the State Normal School, at Bridgewater, Mass., from May, 1848, to January, 1853; principal Boys' High School, Salem, Mass., January, 1853, to November, 1853; school visitor for Massachusetts, from November, 1853, to September, 1854; principal State Normal School at Salem, Mass., from September, 1854, to October, 1857; principal City Normal School, St. Louis, Mo., October, 1857, to September, 1861; principal High School, St. Louis, Mo., September, 1861, to March, 1862; professor of mathematics in State Normal University, near Bloomington, Ill., March, 1852, to June 1862; president State Normal University of Illinois, June, 1862, to January, 1876; pastor First Congregational Church, Princeton, Ill., January, 1876, to present time. Member of school board, Bridgewater, Mass., 1850–51; member school board, Normal, Ill., 1872–76; member of Illinois State Board of Education, March, 1883; term expires March, 1889. Received honorary degree of A. M. from Harvard College; LL. D. from Shurtleff College, Alton, Ill. Published "Analytical Series of Readers," 1865–67; "Students' Readers," 1876–79; also, several pamphlets and addresses. Married, July 5th, 1849, Betsey J. Samson, daughter of Thomas H. Samson; eleven children, nine living. P. O. address, Princeton, Bureau county, Ill.

GEORGE A. GALE, B. N. S., was born in Northborough, Mass., February 27th, 1827. Entered the Institute May 5th, 1847. He was for many years an agriculturist. Deceased.

JOHN W. MURPHY, B. N. S., C. E., was born at New Scotland, Albany county, N. Y., January 20th, 1828. During his youth he showed great proficiency in mathematics and surveying, and was placed with Mr. William Henry Slingerland, a noted surveyor, and at the age of fifteen years received from him a certificate that he was fully accomplished for the above profession,

which bears date Bethlehem, N. Y., November 15, 1843. On May 5th, 1847, he entered the Institute. In 1849, he was appointed second assistant of the engineers in charge of the western division of the Erie Canal, under Squire Whipple. While connected with Squire Whipple, Mr. Murphy and he first introduced "pin connections" in bridges, a most important step in bridge engineering. Zerah Colburn, in a paper read by him before the British Institute of Civil Engineers, some years ago, refers to and upholds the claims of Squire Whipple and Mr. Murphy to the introduction of this now almost universal connection in American bridge building. About this time he designed a suspension bridge across the Mohawk at Tribes' Hill. This bridge had a vertical truss, to insure stiffness, the plan being original with him.

From 1851 to 1852 he was employed at Montgomery, Ala., in erecting levees on the Alabama river. In 1853–54 he built, under contract, a wooden bridge from the design of F. C. Lowthrop, C. E., at Easton, Pa. It was obligatory by his contract that the work should be executed during the spring and summer months; he found that the rafts that came floating down the river made it impossible for him to erect this bridge in the ordinary manner, that is, by placing trestles or false works in the stream, upon which the superstructure would ordinarily be erected. He devised the following novel plan: wire ropes were suspended from pier to pier, and placing stanchions upon them braced in the usual way, made a temporary bridge, upon which he erected the main superstructure, by which means the rafts passed freely underneath, without danger to his workmen or the raftsmen, who were obliged to float upon the high current of the Delaware.

In 1856, he began to build iron bridges on the plan known as the Murray–Whipple plan. The first of these was on a branch of the Lehigh Valley railroad, and the second a double track bridge for the Beaver Meadow railroad. It was at this time he insisted upon determining the limit of elasticity of bridge iron as being of quite as much importance as the breaking weight, and urged the necessity of testing the different irons. He devised and constructed a testing machine. The idea was considered rather novel at that time by most engineers.

Between 1855 and 1857 he was in partnership with George W. Plympton, at Trenton, N. J., under the firm name of Plympton & Murphy. The financial panic of the latter year put an end to their bridge building. He then took up his residence in Philadelphia, and was connected with the erection of a large number of bridges, of which he was the designer.

In 1859, in company with Levi Line, George B., Algernon and Percival Roberts, under the firm name of A. & P. Roberts & Co., he being the chief engineer, and I. P. Morris & Co. the builders of the iron work, he erected for the United States government seven bridges for Beal's wagon route, on the Plains, four of which were one hundred feet, and three fifty feet spans, on the Whipple plan, with cast iron arches. Also one of sixty-five feet span, with draw, over Frankford creek, Bridesburg; one of fifty feet span on the Foglesville railroad; one of one hundred and sixty-five feet span, on the Murphy–Whipple plan, over the Delaware river at Easton, for the Lehigh Valley railroad; one of one hundred and sixty feet span, for the Illinois Central railroad, under General McClellan; two of one hundred and twenty-five span over the Jordan creek at Allentown, for the Lehigh Valley railroad company, and one of fifty feet span for A. Campbell & Co., over the canal at Manayunk. This bridge, when finished, was remarkable for its lightness, being sent to its location in a furniture car, but they refused to receive it, as they did not believe it would answer the purpose intended. The bridge was, nevertheless, erected, and is standing at the present time in as good condition as when erected, and for the first six years carried a four inch line of shaft, which transmitted over fifty horse power to the opposite side of the canal; also a four inch water main, and the carriage of the products of their large mills of 20,000 spindles. During the years 1860–61, he occupied the position of chief engineer of the city of Montgomery, Ala., but upon the breaking out of the war, although offered great inducements to remain and cast his lot with the confederacy, his love for the Union was so paramount in his mind that, in escaping from the surveillance under which he was placed until he firmly assured them of his choice, he was compelled to leave, forsaking all of his instruments, papers, library, and other valuable interests.

In 1863, he was called upon by the United States government to replace a bridge over a branch of the Gauley river in West Virginia, destroyed by Gen. Wise, Gen. Rosecrans having command in that department. Mr. Murphy agreed to erect it in twenty-five days; he immediately proceeded to the work, and on the twenty-third day it was ready for use. It was a suspension bridge, 520 feet in length, ten feet roadway, consisting of three spans, supported by eight cables. There was some doubt in the mind of the commanding officer about its answering the purpose for which it was erected, and he so intimated. To test it properly, and convince those in authority, Mr. Murphy asked that a battalion be ordered to make a charge over it, which was done, to the satisfaction of the general in command. It was thus proven that their fears were groundless, and it afterwards passed and re-passed the whole command as long as they occupied that portion of the country. A change of base put it into the possession of the confederates, who burned it down.

In June, 1864, he designed and erected the Union Hall, in connection with the building for the United States Sanitary Fair in Logan Square, in forty days, making the greater part of the drawings at his home at night. The truss arch of this building was purchased by the Pennsylvania Railroad company, and is still used at the depot of departing trains for New York and Pittsburgh.

In the fall of 1869 he designed the pipe aqueduct crossing the valley of the Wissahickon, at Valley Green, for the supply of Germantown, so as to avoid forming a trap, which was approved by Fred Graff, chief engineer of the water department, December 7, 1869, and a contract entered into by him for its erection, which was finished during the summer of 1871. In this structure he carried out the principle he introduced in 1854 in the erection of the bridge at Easton, over the Delaware, for supporting his superstructure, in place of trestle or false works, as was ordinarily used.

But his name will, perhaps, be best perpetuated in the new structure at South street, Philadelphia. Under the authority of the commissioners appointed to carry on this public work, he received the contract for $770,000, and commenced his labors in 1870. The rapid construction of the work has been greatly interfered with by events that few contractors

have been called upon to meet. In attempting to found the piers on the western approach, he was arrested at the instance of the railroad companies, and bound over to court for interfering with the passage of trains, and kept under bonds for a long time, until the assumed rights of the railroads were harmonized in the construction of the bridge by commissioners. On the eastern side, the land was not condemned and a jury appointed to assess damages, until twelve months after signing of the contract, and some fifteen months detention in the work was thereby occasioned, Mr. Murphy being twice arrested and placed under bonds for trespass before all the conflicting interests were settled. In the river, delays occurred again by the passing tugs and tows, and severe loss was sustained by the wilful destruction of three of the pneumatic piles by a tug boat, which occasioned some three months' delay, the pier having been bolted to the bed rock of the river and filled with masonry, all of which had to be removed, and repairs made, and replaced.

The large amount of masonry to be laid across on alluvial deposits of earth, demanded extra caution and care in the construction thereof, and considerable time was required to secure permanent foundations for the magnificent line of arches which graces the western approach. The South street bridge commences at the intersection of Chippewa and South streets, upon the eastern side, to the high ground of the almshouse property beyond the Junction and Westchester railroads, on the west side of the river, connecting with Spruce street.

The entire length of the structure is 1934 feet and 7 inches. consisting of two fixed spans 195 feet 8 inches each, and a draw 198 feet 2 inches in length, supported by a pier at each end of the draw, and one in the center to receive the pivot.

He possessed the pen of a ready writer, and his contributions to the scientific literature of this country extend over a period of twenty years. He was a contributor to a great number of periodicals, on different scientific subjects. His writings were distinguished by a very high order of style, and always forcible, practical and convincing in argument, and withal agreeable and happy in his illustrations. At the time of his death, he was engaged on a paper for the Franklin Institute, entitled "Bridge Building considered normally." He was an excellent speaker,

a good conversationalist, and a most entertaining companion, being gifted with a retentive memory and during his life, in his intercourse with the world, having come in contact with a great variety of persons. He was also a good musician, and wrote music with rapidity and harmony.

Mr. Murphy was twice married. By his first wife he had two children, a son and a daughter. His death took place at his residence on Thirty-second street, Philadelphia, September 27th, 1874, at the age of 47 years.

GEORGE WASHINGTON PLYMPTON, C. E., A. M. *See Instructors, page 165.*

AUGUSTUS ROSSMAN, C. E., son of Stephen and Charlotte (Hoffman) Rossman, was born at Claverack, Columbia county, N. Y., March 15th, 1829. Prepared at Claverack Academy, and entered the Institute May 11th, 1847. Entered upon the work of his profession immediately after leaving the Institute, engaging in land surveying. Held the office of town assessor in Claverack. Died April 2d, 1857.

ADRIAN VAN SINDEREN, B. N. S., C. E., A. M., son of William H. and Lydia M. (Howard) Van Sinderen, was born in Brooklyn, Kings county, N. Y., April 30th, 1833. Attended the school of George W. Francis, in Troy, and entered the Institute May 6th, 1846. Entered Yale College in 1850, graduating in 1854; studied law, and has been, since 1857, engaged in practice in New York city. Was for three years a member of the Brooklyn Board of Education, and for twenty-five years a director of the Brooklyn Library, of which he was president for eight years. Received the degree of A. M. from Yale College. Member of Berzelius Society of Yale College, and American Geographical Society of New York. Married Laura B., daughter of George L. Sampson, of Brooklyn; wife died February 5th, 1872. Two sons. P. O. address, 54 Wall street, New York city.

JOSHUA FORMAN WILKINSON, C. E., son of John and Henrietta W. (Smart) Wilkinson, was born in Syracuse, N. Y., June 12th, 1829. Studied with Prof. Oren Root (now at Hamilton College,) and Joseph Allen. Entered the Institute November 6th, 1846. From 1848 to 1862 was engaged upon the Oswego & Syr-

acuse railroad, Syracuse & Utica railroad and New York Central railroad, as agent, conductor, trackmaster, freight and passenger despatcher, and assistant superintendent. Married, May 9th, 1860, Louisa B. Raynor, daughter of Willett Raynor, of Syracuse, N. Y. Eight children; five living. Was in the army as captain of Co. D, 149th New York Volunteers, from August, 1862, to an honorable discharge in January, 1863. P. O. address Syracuse, N. Y.

JOEL ROOT WOODRUFF, C. E., son of Samuel H. and Eliza M. Woodruff, was born in New Haven, Conn., August 25th, 1828. Prepared for the Institute in the schools of New Haven and Troy, and entered in 1845. After graduation, was assistant engineer on the Troy & Greenfield railroad, assistant engineer on the Brooklyn water works, and the Caracas, Venezuela, railroad. Practiced his profession in Jersey City, N. J., Washington, D. C.; was chief engineer on the staff of the Surgeon General in the New York First Artillery, 1861 to 1865; was a manufacturer in Quincy, Ill.; engineer of the C., B. & Q. railroad; engineer of the Pana and Louisiana railroad; assistant city engineer of St. Louis, Mo.; and for the past ten or twelve years on various roads in Texas; at present, on the Gould Missouri Pacific system of railroads. P. O. address, San Antonio, Texas.

ALFRED ALEXANDER WOTKYNS, C. E., B. N. S., A. B., son of Dr. Alfred and Mary Augusta (Williams) Wotkyns, was born in Troy, N. Y., April 22d, 1831. After leaving the Institute, he entered Union College and graduated in 1850. He then became a coal merchant, which occupation he followed until the time of his death; which occurred November 21st, 1865.

CLASS OF 1848.

JASPER N. BALL, C. E., A. B., (Lyme, N. H.,) was born in Hebron, N. H., April 15th, 1826. Entered the Institute November 4th, 1847. After graduation, he studied for the ministry. In 1864, was a home missionary at Oconto, Wis., and afterwards settled in Grand Rapids, Mich. Died about 1870.

ARCHIBALD LAMONT CHUBB, C. E., B. N. S., son of Jonathan F. and Fanny (Lamont) Chubb, was born at Nankin, Wayne county, Michigan, April 3d. 1836. Prepared at Grand Rapids Academy, Grand Rapids, Mich., and entered the Institute September, 1847. Was a manufacturer of agricultural implements until the spring of 1883; since then has been farming in Dakota, temporarily. Member Board of Education at Grand Rapids, also president of the same. Member Berzelius Society, Yale College, and Kent Scientific Institute, Grand Rapids, Mich. Married, April 8th, 1858, Lois Baldwin, daughter of William Baldwin; two children; wife died July 29th, 1872. Married, November 7th, 1874, Mary A. McMechan, daughter of William McMechan; four children. P. O. address, Grand Rapids, Mich.

CHARLES FREDERIC CREHORE, C. E., M. D., son of Lemuel and Mary A. (Clark) Crehore, was born in Newton Lower Falls, Middlesex county, Mass., June 18th, 1828. Attended the Milton Academy, Milton, Mass., W. H. Brooks' private school, Boston, Mass., and other private schools. Entered the Institute fall term, 1847; left it in 1849, and joined a party of engineers upon the Rutland (Vt.) railroad soon after. At home from 1851 to 1852, and in Europe 1852–53. In Minnesota, 1854 to 1857; during this time, had charge of the Big Sioux and Mankato military road then being constructed unter Capt. James Simpson, United States Topographical Engineer. Studied medicine, and graduated at Harvard Medical School in 1859; practiced medicine in Boston till May, 1861; served as surgeon upon armed steamer Cambridge, 1861; as assistant surgeon in Twentieth Massachusetts Volunteers (infantry), December, 1861, to July, 1862; as surgeon Thirty-seventh Massachusetts Volunteers from August, 1862, to December, 1864. During this time, was one year medical inspector of the Sixth army corps, surgeon-in-chief of division, &c. Since then has resided in Newton, Mass.; manufacturer of press paper. Member Massachusetts Medical Society, and other medical societies; also, Boston Society of Natural History. Married, September 29th, 1857, Mary W. Loring, daughter of Henry Loring, of Boston. Two children. P. O. address, box 1252, Boston, Mass.

JAMES FRANKLIN HOUGHTON, C. E., son of Charles and Mary (Briggs) Houghton, was born in Cambridge, Middlesex county,

Mass., December 1st, 1827. Prepared at High School, Waltham, Mass., and entered the Institute in 1846. Was surveyor general of the state of California from 1862 to 1868; *ex-officio*, register of the state land office for the same period; partner in the shipping and commission house of R. D. Baxter & Co., of San Francisco and Benecia, Cal., 1850–51; wholesale lumber merchant, San Francisco, 1853–54; president Home Mutual Insurance Co., California, 1874–84; president Central Land Co., Oakland, Cal., 1875–84; president South San Francisco Dock Co., 1883–84; and from 1851 to 1884 dealer in lumber and public lands. With Lloyd A. Ryder, designed and built the first state capitol at Benecia, 1852. Member California Academy of Sciences. Published "Report of the Surveyor General to the Governor and Legislature," Sacramento, Cal., 1862, '63, '64, '66, '68, Married, April 14th, 1854, Caroline Sparhawk, daughter of Elisha Sparhawk. Four children. P. O. address, 216 Sansom street, San Francisco, Cal.

Isaac G. Johnson, B. N. S., C. E., son of Elias and Laura G. Johnson, was born in Troy, February 22d, 1832. Entered the Institute in 1846. Never followed his profession. Manufacturer of malleable iron and steel, also gun metal, at Spuyten-Duyvil, New York city. Member of the American Institute of Mining Engineers. Married, May 22, 1855, Jane E. Bradley, daughter of Gilbert Bradley. Five children. P. O. address, Spuyten Duyvil, N. Y.

Elmer H. Locke, B. N. S., was born in Langdon, N. H., December 24th, 1825. Entered the Institute May 3d, 1848.

Lewis Gould Lowe, C. E., B. N. S., A. M,, M. D. *See Instructors, page 166.*

J. G. Nickerson, B. N. S., was born in Chatham, Mass., September 30th, 1856. Entered the Institute May 3d, 1848. Afterward resided at Lynn, Mass. Present address not known.

Henry Sedley, C. E., (New York city,) son of William Henry and Sarah Lapsley (Riddle) Sedley, was born in Boston, Suffolk county, Mass., April 4, 1834. Prepared at Chauncey Hall School, Boston. Entered the Institute in 1848. Began the prac-

tice of his profession in 1850–52, in San Francisco, Cal., leveling, locating streets, and general surveying. Stockholder and trustee of various corporations; at present engaged by *Commercial Advertiser* association, New York city. Designed and built some wharves and streets in California. He wrote Dangerfield's Rest, a romance, N. Y., 1864; Marion Rooke, 3 vols., London; contributed various papers to London periodicals, *St. James Magazine*, (see Allibone), *Spectator*, *Putnam's Magazine*, &c. Delivered an address at the semi-centennial celebration of the Rensselaer Polytechnic Institute, 1874. Is now editor of the New York *Commercial Advertiser;* was formerly one of the editors of the New York *Times*, and afterwards of the New York *Evening Post*. Married, 1860, Anne Norton Lincoln, who died 1871; in 1875, Eleanor Phelps McKeague. Five children, four living. P. O. address, New York city.

JAMES G. THOMPSON, B. N. S., (Norwich, N. Y.,) was born in Sharon, N. Y., January 15th, 1829. Entered the Institute May 3d, 1848. Was editor of *The Free South*, at Beaufort, S. C., and afterward clerk of Chenango county, at Norwich, N. Y., his present address.

CLASS OF 1849.

THOMAS W. BAILEY, C. E., son of Harden and Amanda (Brayton) Bailey, was born at Kingsbury, Washington Co., N. Y., September 21st, 1826. Prepared at the Troy Conference Academy, West Poultney, Vt., and entered the Institute the fall term of 1848. In the fall and winter of 1850–51, was with William Barton, city engineer of Troy, N. Y.; spring of 1851, leveler on the Buffalo & Conhocton Valley railroad; spring of 1852, leveler and roadmaster on Milwaukee & Prairie du Chien railroad; fall of 1852, engaged with Central Military Tract company in Illinois, in charge of engineering party; in 1855, accepted position as resident engineer in charge of Iowa division on American Central railroad in Iowa. From 1857 to 1861, engaged in milling and in hardware business, also in contracting. In 1861, assisted in raising a company for the "Engineers' Regiment of

the West," under Col. J. W. Bissell, and served with the regiment through the war, in Missouri at New Madrid, at Island No. 10, at Atlanta, Savannah, and at Columbia, S. C. Was detailed in the summer and fall of 1862 as military roadmaster of the Mobile & Ohio railroad, under Gen. McPherson. While engaged in this duty, was called upon by Gen. Ross for a plan of a system of fortifications to protect Jackson, Tenn., where a large amount of military supplies was stored, which plan proved satisfactory, and was adopted by Gen. Logan. Also assisted Capt. Prime, chief engineer of the Army of the Tennessee, under Gen. Logan, in fortifying Corinth, Miss. At the siege of Vicksburg he began a system of fortifications at Haines' Bluff, when, after a month of constant exposure and incessant toil, he had a long and dangerous illness, and was sent home on sick leave, July, 1863; returned to the regiment, and served with Captain Prime in fortifying Vicksburg, afterward was on duty with the regiment at Atlanta, which had charge of the pontoon train of the Army of the Tennessee in Gen. Sherman's march through Georgia and the Carolinas. Was made First Lieutenant September, 1861; Captain, October, 1865; Major, June, 1865; and discharged August, 1865. His health being very much impaired, for several years he was unable to perform any kind of labor, and in consequence was obliged to give up his profession; but in 1869 accepted a position on the Chicago, Burlington & Quincy railroad as roadmaster, remaining on this road since that time; is now in charge of track supplies for the Iowa division. Married, April 3d, 1851, at Saratoga, N. Y., Juliette M. Medbery, daughter of Hiram Medbery, of Fonda's Bush, Fulton county, N. Y. Four children. P. O. address, Burlington, Iowa.

CHARLES AMOS CUMMINGS, B. N. S., C. E., son of Amos and Rebecca (Hopkins) Cummings, was born in Boston, Suffolk county, Mass., June 26th, 1833. Prepared for the Institute at the English High School, Boston, and entered May 1st, 1849. Entered upon the work of his profession January 1st, 1857, in Boston. He is a member of the Boston Society of Architects. Married, October 12th, 1868, Margaret, daughter of Moses Kimball. Three children. P. O. address, Boston, Mass.

JOSEPH SAMUEL FISHER, C. E., son of Samuel and Mary (Bowman) Fisher, was born at Northborough, Worcester county, Mass., April 13th, 1828. Entered the Institute May 3d, 1848. Was located for some time at Memphis, Tenn. He died at New Orleans in September, 1865, of yellow fever.

JAMES HARDING FROTHINGHAM, B. N. S., C. E., (Brooklyn, N. Y.), was born in Salem, Essex county, Mass., June 2d, 1833. Prepared for the Institute in Brooklyn Grammar School, and entered in the spring of 1849. He was variously engaged in mercantile and other non-professional pursuits, and was a member of the Brooklyn Board of Education for several years. Married, November 4th, 1862, Wilhelmina E., daughter of Theodor Victor of Brooklyn. Five sons; three living. P. O. address, No. 238 Clinton street, Brooklyn, N. Y.

GEORGE M. HALL, C. E., (Derry, N. H.), was born in Goffstown, N. H., March 26th, 1829. Entered the Institute June 6th, 1848. He engaged in merchandising in Bastrop, Texas, where he died in 1857.

HOLLAM L. PECK, C. E., was born in Troy, N. Y., January 8th, 1831. Entered the Institute May 5th, 1847. He practiced his profession in Schenectady, N. Y. Deceased.

GEORGE BROOKE ROBERTS, C. E., B. N. S., was born January 15th, 1833, in Montgomery county, Penn. He was graduated in 1849. In 1850–51 he held the position of assistant in mathematics and geodesy, in the Institute. Entered railway service in March 5th, 1851; to May, 1852, rodman mountain surveys, location Pennsylvania railroad; May, 1852, to spring of 1853, assistant engineer, location Sunbury and Erie railway; spring of 1853 to fall of 1854, principal assistant engineer, location North Pennsylvania railroad; fall of 1854 to spring of 1857, principal assistant engineer construction Northwestern Pennsylvania railroad; spring of 1857, chief engineer Allentown railroad of Pennsylvania; 1857 to 1862, chief engineer Mahanoy and Broad Mountain railroad, Lorberry Creek railroad, Cape May railroad, and one or two other minor roads; May 28th, 1862, to 1868, assistant to the president of the Pennsylvania Railroad company; May 3d, 1869, to March 26th, 1873, fourth vice president; March 26th,

1873, to June 3d, 1874, second vice president; June 3d, 1874, to June 1st, 1880, first vice president, and June 1st, 1880, to date, president of the Pennsylvania Railroad company; has served as chief engineer of a number of railways, and is also now president of several corporations not herein enumerated. P. O. address, office of P. R. R., Philadelphia, Pa.

PORTER ROCKENSTYRE, C. E., was born in Brunswick, N. Y., March 21st, 1827. Entered the Institute November 9th, 1848. He did not practice his profession, but engaged in manufacturing in Chicago, Ill. Deceased.

JULIUS AUGUSTUS SKILTON, B. N. S., A. M., M. D., son of Avery J. and Mary A. (Candee) Skilton, was born in Troy, Rensselaer county, N. Y., June 29th, 1833. Studied at Troy with Mr. Burnett, Rev. John Smith, at Poultney, Vt., Bishop Jesse T. Peck, Prof. John Newman, of Union College, Dr. Oran Faville. Entered the Institute in 1847. Entered upon the work of his profession, (medicine and surgery), in October, 1855, in Troy, N. Y.; was city physician of Troy, N. Y., 1857–58; member of the Board of Education of the city of Troy, 1856; consul general of the United States at Mexico City, Mexico, as follows: consul, 1869–72, consul general, 1872–78; received honorary degree of A. B. from Wesleyan University, Middletown, Conn., 1853; A. M. from Wesleyan University; M. D. from Albany Medical College, Albany, N. Y., 1855; member of the Rensselaer County Medical Society, Geographical and Statistical Society of Mexico, Medical Society of Pedro Escobedo, Mexico; published various annual commercial reports in the "Commercial Relations between the United States and other Countries," by the United States government, Washington, between the years 1869 and 1878, and "Mining Districts of Parhuca, Real del Monte, El Chico and Star Rosa, State of Hidalgo, Republic of Mexico;" assistant surgeon New York volunteers, Thirtieth New York infantry regiment, 1861; surgeon United States volunteers, Eighty-seventh New York infantry regiment, 1862; spent part of summer of 1862 in Libby prison; released in bad health; surgeon First New York artillery, 1863; surgeon Fourteenth New York cavalry, 1863; medical director cavalry department of the Southwest, 1864 and 1865. Married, June 12th, 1856, Harriet E.,

daughter of Samuel C. Ingersoll, of Cazenovia, N. Y. Three children. P. O. address, Mexico, Republic of Mexico.

GEORGE ANDREW STEARNS, C. E., son of Ephraim and Rachel (Learoyd) Stearns, was born in Waltham, Middlesex county, Mass., September 2d, 1827. Attended High School at Waltham, and was also a machinist. Entered the Institute in 1848. He was engaged on the Troy and Boston railroad as civil engineer eight months in 1849; superintendent of Waltham bleaching and dye works, 1870–73; clerk for the same firm, 1852–70; treasurer Waltham gas light company; member of school board of Waltham four years. Married, October 3, 1853, Lucretia Kendall Viles, daughter of Jonas Viles. Eight children. P. O. address, Waltham, Mass.

BENJAMIN TURNER, C. E., was born in Haddam, Conn., July 8th, 1825. He entered the Institute November 1st, 1848. He accepted a position on a Nicaragua railroad as chief engineer. Died about 1848.

ALFRED WILKINSON, C. E., son of John and Henrietta W. (Swart) Wilkinson, was born in Syracuse, N. Y., August 17th, 1831. Entered the Institute November 1st, 1848; in 1844 employed as rodman; 1847, traveled in Europe; 1848 and 1849, at the Institute; then in a machine shop and foundry; 1855–56–57, assistant superintendent Michigan Southern railroad; since 1858 banker, of the firm of Wilkinson & Co. He was appointed United States Internal Revenue Collector by President Lincoln in 1862, serving until 1865. He was formerly a member of the New York Stock Exchange, and a member of the Century and Lotos Clubs, of New York city. Mr. Wilkinson entertained Wilkie Collins and Thomas Hughes at his house in Syracuse, and Samuel J. Tilden was his guest at the time he was nominated for governor. Married, July 15th, 1854, Charlotte Coffin May, daughter of Samuel J. May. Nine children ; seven living. He died at his home in Syracuse, N. Y., July 7th, 1886.

CLASS OF 1850.

EDWARD AUGUSTUS HOLYOKE ALLEN, C. E. *See Professors, page 133.*

JOHN FISKE BARNARD, C. E., son of John and Sarah R. (Bigelow) Barnard, was born in Worcester, Worcester county, Mass., April 23d, 1859. Attended the common schools, also Bridgewater Normal School. Entered the Institute November 7th, 1849. Began professional work in 1850, on the St. Lawrence and Atlantic railroad, now a part of the Grand Trunk railroad of Canada, and was assistant engineer on construction and resident engineer on that road for seven years; for five years was superintendent of the Carrillon & Grenville railroad, in Canada; January, 1863, was superintendent of the Montreal and Champlain railroad; 1864 to 1866, superintendent of Buffalo and Lake Huron division of the Grand Trunk railroad; 1866 to 1869, chief engineer of the Grand Trunk railroad; 1869 to 1870, chief engineer and superintendent Missouri Valley railroad; July 1st, 1870, to June, 1871, chief engineer Kansas City, St. Joseph and Council Bluffs railroad; June, 1871, to April, 1872, chief engineer and general superintendent St. Joseph and Denver City railroad; August, 1872, till present time, general superintendent of last named road; general superintendent St. Joseph and Des Moines railroad from July, 1881, till present time; was also appointed general manager of Hannibal and St. Joseph railroad April 1st, 1884; designed and built fifty miles of St. Joseph and D. C. railroad, and four branches of Kansas City, St. Joseph and Council Bluffs railroad; has held several directorships, secretary and treasurerships of St. Joseph Union depot company; president of Atchison Union depot and railroad company; president of Union stock yard company, St. Joseph, Mo.; member of American Society of Civil Engineers. Married, April 21st, 1853, Gertrude A. Harvey, who died March 25th, 1865, leaving four children. Married, April 28th, 1868, Julia B. Keefer. Seven children. P. O. address, St. Joseph, Mo.

JAMES WILLIAM BRADSHAW, C. E., son of William and Sarah M. (Sterry) Bradshaw, was born in Lansingburgh, Rensselaer county, N. Y., October 15th, 1833. Prepared at Lansingburgh

Academy and Troy Conference Academy, and entered the Institute, November 8th, 1849. In 1850–51 was repeater of mechanics and experimental physics in the Institute. In 1851 was at St. Johnsville, N. Y., on the Erie Canal improvement; in 1852, at Racine and Beloit, Wis., and on Racine, Janesville & Mississippi railroad as leveler, 1835–54. In 1855–57, established a land agency, with engineering, at Des Moines, Ia. 1858, studied medicine with the late Dr. A. D. Hull, of Lansingburgh, N. Y. In 1859 he resided in St. Louis, Mo., from January to October, and on a journey from that place to Fort Randall, D. T., was taken with typhoid fever, and died December 7th, 1859.

Jose Tell Ferrao, B. N. S., was born in Caxias, Maranhao, Brazil, July 16th, 1823. Entered the Institute May 2d, 1849. After graduation he remained at the Institute for a year as repeater or assistant in chemistry, botany and zoology. On returning to South America, he became principal of a shcool for young ladies, at Bahia, Brazil. He died about 1870.

Cornelius Stewart Masten, C. E., son of Henry Van Wyne and Hannah (Nichols) Masten, was born in Troy, Rensselaer county, N. Y., September 5th, 1832. Attended Barnett's select school at Troy, preparatory school of the Rensselaer Institute, Troy Conference Academy, Poultney, Vt., and entered the Institute November 5th, 1847. Entered upon the work of his profession in 1851, in the office of the city surveyor, Troy, N. Y. May, 1852, was draughtsman, Illinois Central railroad, Chicago; September, 1852, leveler, Rockford & Rock Island railroad, Rockford, Ill.; March, 1853, assistant in charge of construction Beloit & Madison railroad, Beloit, Wis., and Chicago & Galena railroad; March, 1855, assistant in charge of construction, Beloit & Madison railroad; March, 1857, Milwaukee & Beloit railroad, Milwaukee, Wis.; November, 1860, assistant on Houston, Trinity & Tykee railroad, to April, 1861; 1866, resident engineer in charge of surveys, New York & Oswego Midland railroad, and preliminary surveys for West Shore railroad; May, 1867, resident engineer New York & Oswego Midland railroad, to May, 1872; chief engineer Middletown & Crawford railroad, 1861; May, 1872, to May, 1876, chief engineer and superintendent Rochester & State Line railroad; 1878, surveyor on Brattle-

boro & Whitehall railroad, and roadmaster of Chicago, Burlington & Quincy railroad, Illinois ; 1879, chief engineer Chicago & Southern railroad, Illinois; 1880, assistant engineer Wabash railroad, Springfield, Ill.; 1881, chief engineer St. Louis, Jerseyville & Springfield railroad, Springfield, Ill.; 1882 to date, resident engineer western division Wabash, St. Louis & Moberly railroad. Engaged in general surveying and mining in California, 1855–56 ; teller Cambridge Valley Bank, Cambridge, N. Y., 1857. In trade in Chicago, Ill., coal oil and lamps, 1858–59 ; farming in Washington county, N. Y., 1860. In volunteer service, 1861–65, captain and brevet major First New York Mounted Rifles. Superintendent Monroe County Silver mining company, 1879, at Divide, Montana. Superintendent manufacturing company, Bennington, Vt., 1877. Is a member of the American Society of Civil Engineers. Married, January 6th, 1857, Josephine Minerva Russell, daughter of George Russell, of East Salem, Washington county, N. Y. Three children. P. O. address, Moberly, Randolph county, Mo.

NATHANIEL MORTON, C. E., son of Ichabod and Betsey (Holbrook) Morton, was born May 20th, 1831, in Plymouth, Mass. Attended Bridgewater Normal School, and entered the Institute November 7th, 1850. In 1852–53–54, was engaged in mining in California ; 1855, in teaching school ; 1856, in architects' office Janesville. Wis., and Chicago, Ill.; 1857–59, in Cuba, West India Islands, in roofing business ; 1860–61, book-keeping in Boston ; 1862–71, manufacturing and selling roofing materials in New York city and Brooklyn ; since 1871, manufacturing and selling bedstead fastenings and machinery at Plymouth, Mass. For five years, and at present, a member of the Board of Water Commissioners and School Committee, Plymouth, Mass. Married Lizzie F. Robbins, daughter of Leavitt T. Robbins ; one daughter. P. O. address, Plymouth, Mass.

REUEL WILLARD WARE, C. E., son of Reuel and Hannah (McIntosh) Ware, was born in Wellesly, Norfolk county, Mass., September 10th, 1826. Prepared for the Institute at Grantville Academy, Mass., and Williston Seminary, East Hampton, Mass., and entered November 7th, 1849. Spent one year after graduating in making village and land surveys in eastern Massachu-

setts. Commenced railroad engineering October, 1851, in Connecticut; in charge of surveys and construction of a division of the Hartford, Providence & Fishkill railroad to February, 1856. May, 1856, to February, 1865, in charge of surveys and construction of sundry lines of railway in Wisconsin, lines which have since been merged in and taken up by the Chicago, Milwaukee & St. Paul railroad. June, 1865 to 1867, was assistant engineer Chicago, Burlington & Quincy railroad; March, 1868, to May, 1873, resident and division engineer on New York & Oswego Midland railroad, in charge of construction in New York; May, 1873, to January, 1875, resident engineer Erie railroad, in charge of construction of second track work, bridges and buildings, Delaware division. January, 1875, to May, 1882, resident engineer Erie railway (now New York, Lake Erie and Western railroad), in charge of construction Delaware division, and maintenance of way department,; since that time, principal assistant engineer New York, Lake Erie & Western railroad. Before graduation, was one year on Boston Water Works, engaged in earth and rock excavations and embankments, rock tunnels, brick and stone conduits, culverts and bridges. Is a member of the American Society of Civil Engineers. Married, February 8th, 1856, Mary Ellen Downes, daughter of Anson Downes, of Waterbury, Conn; one daughter. P. O. address, Port Jervis, Orange county, N. Y.

CLASS OF 1851.

WILLIAM HOLLEY BURRALL, C. E.. (Bridgeport, Conn.,) son of William Porter and Harriette (Holley) Burrall, was born in South Canaan, Litchfield county, Conn., May 29th, 1832. Attended school in West Cornwall, Conn., and entered the Iustitute in 1848. Entered the service of the Illinois Central railroad in 1852, as rodman; had charge of fourteen miles of grading work at Kankakee; had charge of track-laying south of Kankakee; 1854–55, had charge of eighty miles of masonry construction from Kankakee to Urbana; ran levels of first survey of Mineral Point railroad, Wisconsin, and ran transit on a survey from Chicago to a point near Rock Island, on the Mississippi river. During a part of 1856 and 1857 was chief engineer

of Cairo and Fulton railroad, of Missouri : 1864, superintendent of machine tool works, Springfield, Mass., 1867, entered firm of Hawkins, Herkel & Burrall, iron and wooden bridge builders, and mechanical and civil engineers. Has practiced his profession alone since 1876, and as an engineer of bridges and iron works at Springfield, Mass. P. O. address, Springfield, Mass.

DAVID MAXSON GREENE, C. E. *See Directors, page 131.*

CHARLES LEWIS LOOMIS, C. E., son of George S. and Mary Ann (Lewis) Loomis, was born at Dewitt, Onondaga county, N. Y., March 31st, 1833. He was an intelligent, thoughtful, studious boy, even while in the public school of his native village. In 1845–46 he had for several months the superior advantages of the Fayetteville Academy, three miles distant from his home, under the excellent instruction of Rev. David Pease. He was then, for a year or more in the Seminary at Chittenango, Madison county, N. Y. From there, in 1848, he went to the Oneida Conference Academy, in Cayuga, where he remained nearly two years. Thus far his education had not been with any definite idea of fitting him to enter the Institute, or upon the life of a civil engineer. He had discovered tastes and qualities which decided him then, however, to adopt that profession. After that decision was made, he studied mathematics for a short time with Charles Roundy, who was for many years principal of the High School in Syracuse, N. Y. He entered the Institute in 1850. He was engaged on the construction of the Syracuse & Binghamton railroad, with headquarters at Tully. He was at one time on state work on the Erie canal, just east of Oneida, and there received a handsome testimonial to his good character and skill, from his chief. About 1856 he was engaged on the Black River canal at Lyons' Falls. In 1857 he went to Northfield, Minn., thinking there would be a good opening for him on some of the railroads which were then just agitating the minds of the people of that growing State, and while waiting for those enterprises to develop, he interested himself, with his brother, in flouring mills, during the following year, the only remaining one of his life, doing nothing in the line of his profession except occasional land surveying. He died May 4th, 1858, from hydrophobia, at Northfield, Minn.

SAMUEL EDWARD WARREN, C. E. *See Professors, page 139.*

CLASS OF 1852.

In consequence of the extension of the courses of study, none were graduated in the year 1852.

At the annual commencement, June, 1884, the degree of Civil Engineer was conferred upon William B. Coggswell, of Syracuse, N. Y., of the class of 1852, in consideration of successful and distinguished public service during a period of thirty years.

WILLIAM B. COGSWELL, C. E., (Syracuse, N. Y.,) son of David and Mary Cogswell, was born in Oswego, Oswego county, N. Y., September 22d, 1833. From seven to ten years of age, attended Hamilton (Oneida county) Academy, Zenas Morse, principal; afterward, private school of Joseph Allen, in Syracuse, N. Y., and school of Prof. Orin Root, in Seneca Falls, N. Y. Spent two years with an engineering party on the survey of the Oswego & Syracuse railroad. Entered the Institute May 1st, 1850. After graduation, served an apprenticeship in the Lawrence (Mass.) machine shop under John C. Hoadley. In 1856, took charge of the machinery of the Marietta & Cincinnati railroad, at Chillicothe, Ohio, and remained three years. In 1859 and 1860 was superintendent of the Broadway foundry, St. Louis, Mo. In 1861 was appointed civil engineer in the United States navy. Fitted out five repair shops for different stations on the Atlantic seaboard, and lived at one of them erected on shipboard at Port Royal, S. C. In 1862, was transferred to the Brooklyn Navy Yard, in charge of steam repairs, remaining four years, and the following two years was located in New York city. In 1868, went to Oswego, N. Y., to build an iron bridge over the Oswego river. In 1860, took charge of the Clifton suspension bridge at Niagara Falls, N. Y., and at the same time was employed at the Franklin iron works (Oneida county), in the construction of two blast furnaces, till 1874, when he took charge of the Mine La Motte lead mines, Madison county, Mo., which management he still retains. In 1881, he started the construction of the Solvoy Process Co.'s works at Syracuse, N. Y., of which he is at present the general manager and treasurer. Is a member of the American Society of Civil

Engineers, vice president of the American Society of Mining Engineers, manager of the American Society of Mechanical Engineers, fellow of the Society of Chemical Industry, London, England, and member of the American Association for the Advancement of Science. Married, January 31st, 1856, Mary W. Johnson, daughter of Reuben Johnson; one daughter. His wife died July 28th, 1877. P. O. address, Syracuse, N. Y.

CLASS OF 1853.

JOHN A. BAGLEY, C. E., (New York city,) son of John S. and Margaret A. (Harper) Bagley, was born in New York city, September 10th, 1833. Attended Putnam School, Newburyport, Mass., and and entered the Institute in September, 1850. Entered upon the work of his profession August, 1853; was one year in North Carolina, eighteen years in New York city. Is a member of the New York Microscopical Society. Wrote articles on engineering subjects for Appleton's New American Encyclopedia, 1858. Married, March 13th, 1877, Katherine C. Corey, daughter of Allen Corey. P. O. address, 45 East 28th street, New York city.

FREDERICK OSBORN BURHANS, B. N. S., (Warrensburgh, Warren county, N. Y.,) son of Benjamin P. and Rebecca (Wickes) Burhans, was born at Saugerties, Ulster county, N. Y., September 1st, 1832. Attended Ballston Spa Institute, and the Swing Institute, Tarrytown, N. Y., and entered the Institute in 1849. In 1854, engaged in the manufacture of hemlock sole leather with his father, and has continued in the same business ever since, under the firm name of B. P. Burhans & Son. His father died in 1875, and he has carried on the business alone since that date. Married, at Goshen, Ind., January 1st, 1855; five children, one living. P. O. address, Warrensburgh, Warren county, N. Y.

CHARLES HENRY FISHER, C. E., son of Thomas Henry and Mary Chatfield (Hedge) Fisher, was born in Lansingburgh, Rensselaer county, N. Y., June 10th, 1835. Prepared for the Institute at the Lansingburgh Academy, and entered October 19th,

1851. He left a short time before completing the course, but at the annual commencement, June, 1882, the honorary degree of Civil Engineer was conferred upon him as chief engineer of the New York Central & Hudson River railroad, and in recognition of his successful and honorable professional service, during a period of nearly thirty years. He was employed on the Racine, Janesville & Milwaukee railroad, from December 25th to June, 1853; on the enlargement of the Erie canal, October, 1854, to April 1st, 1857; on the New York Central railroad, as assistant and resident engineer, 1859 to April 24th, 1868. He was chief engineer of the Oswego & Lake Ontario Shore railroad from April 24th, 1868, to January 1st, 1869, when he was appointed chief engineer of the New York Central & Hudson River railroad, holding this position until he was retired on account of ill-health, December 1st, 1885. He was consulting engineer of the Cantilever bridge at Niagara. The additional track from Albany to Buffalo was laid under his direction. He built the depots at Albany, Syracuse, Rochester and Buffalo; also the Buffalo stock yard, the De Witt yards and shops, and the Broadway crossing in Albany, and the elevated road in Rochester. He located the lines of the Oswego & Lake Ontario Shore railway. Was principal of the Lansingburgh Academy from 1858 to 1859. Member of the American Society of Civil Engineers. He married, June 27th, 1878, Henrietta Lester Mulford, daughter of Robert L. Mulford, of New York city. Four children.

DASCOM GREENE, C. E. *See Professors, page 148.*

CHARLES M. OSBORNE, C. E., (Rock Island, Ill.,) son of Marcus B. and Elizabeth A. W. (Grant) Osborne, was born at Sag Harbor, Long Island, N. Y., March 17th, 1833. He prepared at Davenport College and entered the Institute in 1849. He never practiced the profession of civil engineer, but of the law. Was formerly practicing lawyer at Rock Island, Ills.; now at Chicago, Ills. P. O. address, 94 Washington street, Chicago, Ill.

WILLIAM TWEEDDALE, C. E., (Castleton, N. Y.,) son of Edward and Janet (Kerr) Tweeddale, was born in the town of Beith, Ayrshire, Scotland, May 18th, 1823. He came with his parents to New York city in March, 1833, and subsequently resided in

Albany and in Saratoga county, N. Y. In August, 1835, he returned to New York city. April, 1836, he went to his home, then at Bethlehem, Albany county, N. Y., and engaged in farming until the winter of 1848, when he entered the Troy Conference Academy, Poultney, Vt., remaining one and one-third terms. He entered the Institute iu the fall of 1849, class A, remaining one term. Re-entered in the fall term of 1851, and graduated in 1853. Was employed as assistant in the office of the city engineer, Troy, N. Y., and on construction of the Albany & Susquehanna railroad until September, 1854, when he returned to the Institute and took charge of field work. In the fall of 1855 was bridge engineer and contractor in Chicago. He designed and built the superstructure of an iron roadway swing bridge and a wooden railway swing bridge. In 1859, having the contract for the construction of buildings and bridges on the Dubuque & Sioux City railroad, he moved to Dubuque, Iowa, January 19th, 1860. In the fall of 1860 he designed and erected the Dubuque elevator. On the breaking out of the war he raised a company for the engineer regiment of the West, Missouri Volunteers, and was mustered in as captain of Co. H, and as such was engaged in the engineering operations against New Madrid which resulted in its capture; organized and constructed to successful completion the cutting of a passage for a fleet of transports and barges for the lower end of Island No. 8, across fields, through woods and bayous, a distance of twelve miles, to New Madrid. This fleet was used for the transportation of troops across the river from New Madrid to operate against Island No. 10, the accomplishment of which resulted in its immediate evacuation and the opening of the river to Fort Pillow. Was in command of advanced parties of engineer troops with General Pope's division in the siege of Corinth, and in the pursuit that followed its evacuation under General McPherson, military superintendent of railroads; was engaged in similar engineering work, reconstruction of railroads, dredging of rivers and removal of debris at various points on the Mississippi, and afterwards across the country to the Atlantic, thence northward to Richmond. He was promoted to brevet-colonel of volunteers March 13th, 1865. Took part in the review of the western army at Washington, D. C., May 24th, and was mustered out May 31st, 1865, having been in service

from the commence of the war. He superintended the construction of the iron bridge over the Connecticut river at Warehouse Point. He returned West in the fall of 1866, residing in Chicago until August, 1867 ; moved to Topeka, Kansas, and during 1867 and 1868 superintended the erection of the east wing of the state capitol, and was engaged on the same building the following year ; was engineer of the bridge nine hundred feet in length across the Kansas river at Topeka ; was variously employed in general engineering work as city engineer from 1870 to 1878 ; was engaged in work for the west wing of the capitol in 1879 and 1880, and also on foundation for government buildings. He was employed on same buildings in 1881, 1882 and 1883. He married, January 19th, 1860, Ellen W. Parker. Three children, one living. P. O. address, Topeka, Kansas.

GEORGE CABOT WATRISS, C. E., (New York city,) son of George Ellis and Martha Cabot (Betterly) Watriss, was born in Boston, Mass., September 22d, 1836. Entered the Institute in June, 1850. Engaged on survey of Saratoga & Sacketts Harbor railroad ; Erie canal enlargement ; at Pacific Iron Works, San Francisco, Cal.; Resdon Iron and Locomotive Works, San Francisco, Cal.; motive power and machine department, Central Pacific railroad, California ; bridge and building department, Central Pacific railroad, California ; California street and Market street cable railroads, San Francisco, Cal.; draughtsman for the above mentioned works. P. O. address, West Oakland, Cal.

CLASS OF 1854.

CALVIN ACKLEY, C. E., son of Amos and Catharine (Westfall) Ackley, was born at Kinderhook, Columbia county, N. Y., November 26th, 1833. Prepared at Kinderhook Academy, and entered the Institute May, 1852. Deputy collector of internal revenue, 1866 to 1883. P. O. address, Kinderhook, N. Y.

THOMAS K. BALTZELL, JR., C. E., (Tallahassee, Fla.,) was born in L. P. Georgia, March 19th, 1832. He prepared for the Institute at Mount Airy Agricultural Institute, in charge of Jonathan

R. Powell, C. E., class of 1846, and entered November 7th, 1849. After graduation, returned to Florida, and was assistant engineer on a railroad. Deceased.

JOHN MORTON CLINCH, C. E., (Boston, Mass.,) son of Joseph Hart and Greselda E. (Cunningham) Clinch, was born in Windsor, Nova Scotia, March 6th, 1833. Prepared for the Institute in the Boston Latin School, and entered October, 1850. Was in the office of G. J. F. Bryant, architect, Boston, from 1854 to 1858; then became a member of the firm of William Bond & Son, chronometer and watch makers, where he still remains. Is a member of the Society of Arts, Massachusetts Institute of Technology, Boston. In 1812, William C. Bond, the grandfather of the present William B. Bond, made the first marine chronometer manufactured in this country. His son, Richard F. Bond, invented the chronograph, for recording astronomical observations by electricity, which received the award of the Grand Council medal at the World's Fair in London, in 1851; he was also the inventor of the first break circuit clocks, and several improvements in break circuit clocks, and of the clock at the Liverpool Observatory, England, which is the finest running clock in the world. The firm are also the inventors and manufacturers of the best break circuit chronometers in use, and some of their chronometers at the Naval Observatory, Washington, have made the finest record ever made there. P. O. address, 97 Water street, Boston, Mass.

HENRY CURTIS, JR., C. E., son of Henry and Rebecca L. (Everett) Curtis, was born in Boston, Mass., August 13th, 1834. Prepared at English High School, Boston, and entered the Institute in 1852. Engaged as surveyor and civil engineer in Boston for nine months after graduating; then as civil engineer at Rock Island, Ill. Was admitted to the bar in Illinois in 1859, and has since that time practiced law in Rock Island, Ill., except four years when in the army. Was second lieutenant, first lieutenant and captain of Company A, Thirty-seventh Illinois Volunteers, infantry, 1861–62; resigned and was appointed assistant adjutant general of volunteers by President Lincoln, in 1862, with the rank of captain; resigned in the spring of 1865. Was twice wounded, and breveted major and lieutenant-colonel

for services in the field. Married, December 15th, 1857, Lucy R. Osborn, daughter of Marcus B. Osborn, of Rock Island, Ill. Nine children; four living. P. O. address, Rock Island, Ill.

JOSEPH A. MOAK, C. E. *See Instructors, page 166.*

CLASS OF 1855.

JAMES THEODORE ALLEN, B. S. *See Professors, page 147.*

FRANCIS COLLINGWOOD, C. E., son of Francis and Elizabeth (Kline) Collingwood, was born in Elmira, Chemung county, N. Y., January 10th, 1834. Prepared for the Institute in the common school and academy at Elmira, and studied by himself while learning the watchmaker's business. Entered spring term of 1853. Had some experience as rodman before entering the Institute. After graduation, was engaged on a railroad in Wisconsin, in 1857; compass surveys near Elmira, 1855 to 1869; expert and referee in cases before the courts; city engineer of Elmira for several years, putting in the first permanent sewer, and was offered charge of water works, but refused, considering the proposed plan unsound. In 1869, made preliminary surveys for a railroad in Pennsylvania. From 1857 to July, 1869, successfully conducted the jewelry business and sale of scientific instruments, at Elmira. In July, 1869, accepted position as assistant engineer on the East River Suspension Bridge, where he remained until July, 1883. He was connected more or less with all parts of the work, but more especially with the caisson sinking and fittings, building of the towers, anchorages, New York approach and New York station, the last two being essentially of his own design throughout. Before leaving the bridge, he had prepared designs for preparation of the arches of one block in the New York approach for use as warehouses.

In 1883–84, he made extensive repairs to the Allegheny Suspension Bridge at Pittsburgh, which had suffered from rusting of the cable wires at the anchorages. Spent the summer of 1884 in Europe, and another year in regaining his health. In the fall of 1885, accepted a position as regular contributor to the *Sanitary Engineer*, and has since written a large share of the

engineering articles ; at the same time, opened an office at No. 160 William street, New York, as consulting engineer for general engineering.

Was school commissioner at Elmira, and loan commissioner of Chemung county. Was always active in church work ; vestryman and sunday school superintendent in Trinity and Grace churches in Elmira ; also treasurer in both ; also, in Church of Heavenly Rest, New York, and St. John's, Elizabeth ; trustee of the Episcopal church mission to seamen, in New York, &c. Is corresponding member of the American Institute of Architects, and of the Elmira Microscopical Society ; honorary member of the Rensselaer Engineers' Society ; member of Elmira Academy of Science, and one of its founders ; New York Microscopical Society, New York Academy of Science, American Society of Civil Engineers, American Institute of Mining Engineers, and the Institution of Civil Engineers of England. He was on the board of managers of the American Society of Civil Engineers for several years, and was a member of the committee on rapid transit of the society whose report undoubtedly hastened the building of the elevated roads in New York. For several months, during a cessation of work on the bridge, he was engaged in working up the cost of terminal expenses on various articles of merchandise at New York for the Erie road, about 1875. At present he is chairman of a committee of the American Society of Civil Engineers for determining the lineal compression of cements, mortars, &c., under various conditions of age, mixture and loading, whose work is just begun.

Aside from numerous short communications to papers at Elmira, and since leaving there to other papers, has written two articles on the caissons of the East River bridge, two on its anchorages, one on the masonry, one on cement and brick tests, and a number of reports of progress on the same. Also, one paper on wind pressures, one on preservation of forests, one on cement testing, and one on tests of steel and iron, the last two as discussions of other papers. All these, together with one on the power of water to transport land, and a number of other discussions, are printed in the transactions of the American Society of Civil Engineers. One paper on combustion in compressed air, was printed in the Journal of the Franklin Institute about 1872 ; a discussion on steel castings, in 1885, before the

American Mining Institute; a paper in 1884 to the Institution of Civil Engineers, on repairing the cables of the Allegheny suspension bridge; for this he was awarded the Tilford medal and the Tilford premium. Delivered public lectures at Elmira on the Weather, and numerous short talks on scientific subjects, before the Elmira Academy of Science, &c. Delivered the annual address at Troy in 1880, on "Engineering as a development from our modern civilization." Is now (1886) writing a series of articles for the *Sanitary Engineer*, on "Fire-proof construction." Married, June 5th, 1880, to Eliza W. Bonnett, of New York, daughter of Daniel Bonnett. P. O. address, Elizabeth, N. J., or 160 William street, New York.

CHARLES EDWARD CROSS, C. E., (Lawrence, Mass.,) was born September 24th, 1837, at Amesbury, Mass. Entered the Institute summer session of 1853. After graduation he went to the U. S. Military Academy at West Point, entering in July, 1856, and graduating May 6th, 1861, when he was promoted in the army to brevet second lieutenant, corps of engineers; served during the war of the rebellion 1861–63, in drilling volunteers at Washington, D. C., May 7th to 25th, 1861; as assistant engineer in the construction of defenses of Washington, May 27th to July 1st, 1861; in the Manassas campaign of July, 1861, attached to the second division of the Army of Northeast Virginia; engaged in the battle of Bull Run, July 21st, 1861, and in the construction of defences of Washington, July 23d, 1861, to March 10th, 1862; in command of an engineer company, army of the Potomac, in the Virginia peninsular campaign, 1862, being engaged in the siege of Yorktown, and in the subsequent operations of the campaign, in the construction of roads, field-works and bridges, particularly for the passage of the army and its immense trains over the White Oak Swamp and Chickahominy river; in command of Engineer Battalion, in Maryland, September to November, 1862, being engaged in the battle of Antietam, September 17th, 1862, in guarding and repairing pontoon bridges across the Potomac and Shenandoah rivers, at Harper's Ferry and Berlin, Md., September 21st to November 3d, 1862, and on march to Falmouth, Va., in November, 1862; in command of Engineer Battalion December, 1862, to February, 1863, and of a company March to June, 1863, in the Rappa-

hannock campaign, being engaged in the battle of Fredericksburgh, in throwing pontoon bridges for the advance and retreat of the Army of the Potomac, across the Rappahannock river, December 11–16, 1862; in disembarking and equipping pontoon train at Belle Plain, and transporting it to Falmouth, Va., January 15–19, 1863; on the "mud march" with pontoon bridge for Banks' Ford, January 20–26, 1863; in constructing field-works, making surveys, guarding bridges, &c., January 26th to April 29th, 1863; in throwing bridge below Fredericksburgh, April 29th, 1863; at the battle of Chancellorsville, in constructing defenses and bridges, May 3–6, 1863, and throwing a bridge, in the face of the enemy, at Franklin's crossing of the Rappahannock, June 5th, 1863, at which time he was killed. He was promoted to first lieutenant, Corps of Engineers, August 6th, 1861; to brevet major, July 1st, 1862; to brevet lieutenant colonel, September 17th, 1862; to captain Corps of Engineers, March 3d, 1863; to brevet colonel, June 5th, 1863, for gallant and meritorious services while assisting to throw a bridge across the Rappahannock, at Fredericksburgh, in the face of the enemy, when he was killed. Age 26 years.

FREDERICK GRINNELL, C. E., son of Lawrence and Rebecca Smith (Williams) Grinnell, was born at New Bedford, Bristol county, Mass., August 14th, 1836. Attended the Friends' Academy, New Bedford, Mass., and entered the Institute in 1852. In the fall of 1852 commenced work as draughtsman at Jersey City locomotive works; with exception of summer of 1858, was in employ of this company as draughtsman and mechanical engineer until fall of 1860; during summer of 1858 was assistant engineer on construction of the (then) Burlington and Missouri river railroad; in winter of 1860 entered employ of Corliss steam engine company, of Providence, R. I., as draughtsman, and was soon elected to official position of treasurer of that company, but was actually employed as superintendent of the works; in January, 1865, accepted position of manager of Jersey City locomotive works, then leased by the Atlantic and Great Western railroad company, to build their locomotives; in fall of 1875 was appointed superintendent of motive power and machinery of the Atlantic and Great Western railroad; before taking this position, spent about three months in visiting the various mechan-

ical establishments of England and Scotland; in 1869 resigned position on the Atlantic and Great Western railroad, and purchased his present interest in the Providence steam and gas pipe company, Providence, R. I; as president of this company he has been its active business manager and mechanical engineer; the work of this company has been furnishing manufacturing establishments with appliances for steam heating and all the varied purposes for which steam is used, building gas works, for lighting them, and equipping them with fire extinguishing apparatus; included in the last named specialty has been the now well known automatic fire extinguisner and alarm, which was first successfully introduced by him, and which system he has done much to perfect, having taken out about forty patents relating to the subject. Married, October 10th, 1865, Alice Brayton Almy, daughter of William Almy, of New Bedford, Mass. Two children. Wife died January 5th, 1871. Married, February, 1874, Mary Brayton Page, daughter of John H. W. Page, of Boston, Mass. Three children. P. O. address, Providence, R. I.

HENRY HOLMES, C. E., was born in Bridgewater, Mass, March 8th, 1835. Entered the Institute October 8th, 1852. Engaged in engineering and architectural business in St. Louis, Mo., until the outbreak of the civil war; was an assistant engineer in the regular navy of the United States from October, 1861, to September, 1865; since the latter date engaged in manufacturing enterprises in Boston and elsewhere. P. O. address, 12 Portland street, Boston, Mass.

AUGUSTO FREDERICO DE LACERDA, B. S., was born in Bahia, Brazil, March 14th, 1836. Entered the Institute in October, 1852. In 1856 entered a cotton factory at Holyoke, Mass., and remained there until the end of 1857, working out all the different processes of the manufacture, and making calculations of all the machinery; went to Brazil, January, 1858, and took charge of a mill at Valencia, remaining seven years, having charge also of a small foundry, pattern and machine shop connected with the cotton mill; afterwards was engaged in and out of the city of Bahia building water works, steam rice hulling, and polishing machines, putting up turbine wheels, and experimenting with the Lenoir gas engine and wind mills; has located and im-

proved several roads in the district of Valencia, building small bridges of masonry and timber for private use; he has served during his residence at Valencia for seven years as counsel to the municipal council of the town for all improvements and new works; was awarded the diploma of Officer of the Grand Order of the Rose by the emperor, Pedro II, for efficient management and services rendered gratuitously to the place; in 1872 was nominated a member of a new society formed with the object of promoting the interests of manufactures, arts, etc. Married, in Troy, N. Y., in November, 1845. Two children. Wife died in Bahia, in 1863. Married in Bahia in 1863. Five children. P. O. address, Bahia, Brazil.

CLASS OF 1856.

CASSIMER WHITMAN BOYNTON, C. E., (Bangor, Me., son of Gorham Lincoln and Louisa M. (Basford) Boynton, was born in Bangor, Penobscot county, Me., February 14th, 1836. Prepared in the public schools of Bangor, particularly in the High School; spent six months in chemical department of Lawrence Scientific School; entered the Institute September, 1853; acted as assistant to the director from September, 1856, to March, 1857. Was rodman on the Brooklyn water works, 1857; assistant engineer in charge of canal works, Brooklyn, 1857; sub-assistant engineer on Mexico & Pacific railroad, 1857–58; assistant engineer Brooklyn water works and New York & Erie railroad, 1858–59; assistant engineer San Francisco city water works, 1859–60; chief engineer San Francisco city water works, 1861–62; designer and general superintendent of reduction works of Mina Prieta silver mining company, near San Antonio de la Huerta, Sonora, Mex., 1863–64; civil engineer and contractor, San Francisco, 1864–65; manufacturer of sewer pipe and kindred goods, 1866 to 1884, Woodbridge, N. J. Designed and built, in 1860, Francisco street reservoir, San Francisco; 1861, Lombard street reservoir; 1861, high service pumping works, 325 feet at a single lift, North Beach Station, San Francisco; 1862, aqueduct tunnel under Black Point, 3,000 feet long; 1860–62, distributive system San Francisco city water works; 1863–64, silver reduction works of the Mina Prieta silver mining

company, near San Antonio de la Huerta, Sonora, Mex.; 1865, tunnel on Mt. Diable coal railroad, near Antioch, Cal. Married, December 20th, 1866, Eunice Adelia Harriman, daughter of John K. Harriman, Georgetown, Mass. Eight children. P. O. address, Woodbridge, N. J.

LEICESTER BURNETT, C. E., son of James and Martha (Spalding) Burnett, was born in De Kalb, St. Lawrence county, N. Y., March 29th, 1830. Attended district school at De Kalb, and was one year at Wesleyan Academy, Gouverneur, N. Y. Entered the Institute March, 1854. Began work on Watertown & Potsdam railroad construction, October, 1856; engaged in location Altoona and Great Western railroad, Pa., 1858. In 1859, had charge of surveying party in re-locating boundary line between Kentucky and Tennessee; in October, 1861, on location surveys of Cedar Rapids & Missouri River railroad, Marshall to Boone, Iowa. In 1864, had charge of location and preliminary survey to the Missouri river. In 1864, was superintendent of construction on division Nevada to Boone and Dent. In 1866, made final location of C. R. & M. R. to Omaha, Neb., and made location of Sioux City and Pacific railroad from Missouri valley to Sioux City. In 1867 was superintendent of construction and built the Sioux City & Pacific railroad from Missouri valley to Sioux City, besides locating the remainder of the line to Fremont, Neb., which he built in 1868, and had general oversight of the location of Iowa Falls & Sioux City railroad. Was superintendent of transportation and track till 1872, then superintendent till 1878. In 1869–70 had general charge of material for Iowa Falls & Sioux City railroad; attended to the running and furnishing the construction trains, and was superintendent of road to Fort Dodge, after track was laid till the Illinois Central took possession in October, 1870. In 1870–71 was superintendent of construction and operation of fifty miles of Fremont, Elkhorn & Missouri River railroad. Roads built under his direction were the Sioux City & Pacific, and first fifty miles of F. C. & Mo. River. Since January, 1878, has lived in De Kalb as a farmer. P. O. address, De Kalb Junction, St. Lawrence county, N. Y.

NICHOLAS H. CHAMBERLAINE, C. E., was born in Easton, Md., and entered the Institute September 27th, 1854. In October,

1856, he went West, and accepted a position as assistant engineer on Des Moines river improvement, and was located at Keosauqua, Ia., where he died of fever in 1855.

JOHN MARSHALL CLARK, C. E., son of Robert and Mary E. (Fitch) Clark, was born at White Pigeon, St. Joseph county, Mich., August 1st, 1836. Prepared at private school in Chicago, kept by Mr. Gleason. Was rodman for one summer in engineer corps on Illinois Central railroad. Entered the Institute 1852. On graduating, entered the service of the Dubuque & Sioux City railroad. In 1859, went to Colorado and did work connected with mines and with water supply. In 1861 went to Santa Fe, New Mexico, remaining two years. In 1864 returned to Chicago, and went into business. Married, January 7th, 1873, Mary Louise Qua, daughter of Charles Qua, of New York city. P. O. address, 2000 Prairie Avenue, Chicago, Ill,

WILSON CROSBY, C. E., son of William Chase and Mary (Wilson) Crosby, was born in Atkinson, Piscataquis county, Maine, October 18th, 1834. Studied in the Atkinson and Bangor public schools. While a student in the Bangor High School assisted land surveyors and engineers of Bangor in their field work, and after completing the course at the High School, in 1852, left his home in Bangor to go to Massachusetts upon railroad work, as axeman, poleman, chainman, etc., on preliminary survey of road now a part of main line of New York and New England railroad. In the fall of the same year was on preliminary surveys of road now known as the European and North American division of the Maine Central railroad, as chainman and rodman. In November, 1853, was rodman on preliminary surveys for road now a part of the Maine Central railroad, from Herman Pond westward, and in the winter of 1852–53 was rodman on the Boston and New York Central railroad, then as leveller. Returned to Bangor, where he studied by himself, doing some surveying and engineering work, and in 1855 went on the Penobscot and Kennebec railroad as leveler. Entered the Institute in September, 1855. In September, 1856, rodman on the Racine and Mississippi railroad, Illinois, and in the following spring was promoted to position of leveler; in winter of 1857 taught a country school in Carroll county, Ill., and in the spring of 1858 went

to St. Louis, Mo., remaining two years; returned to Bangor in 1860, remaining two years, as civil engineer and surveyor; in March, 1862, went to Fort Knox, on permanent masonry, then building opposite Bucksport, Me., as overseer; in March, 1865, resigned position to enter the military service; was appointed second lieutenant of company I, Fourteenth regiment Maine volunteers; remained on duty with the regiment, and was mustered out with it at Augusta, Me., in September, 1865; in December, 1865, on preliminary survey for road in Nova Scotia; returned to Bangor in 1866, and assisted in making up the estimates for this road, and other surveys; in May, 1866, in New York, and in July of the same year entered the engineer corps engaged in the construction of Prospect park, Brooklyn, as division engineer; in March, 1870, resigned that position to enter upon engineering and surveying work in Westchester county, N. Y.; September, 1870, division engineer in charge of surveys between Utica and Cooperstown, and late in October was sent to make a reconnoissance for a road through the Adirondack wilderness to Ogdensburgh; in December returned to Yonkers, N. Y., and was engaged until the spring of 1871 in estimates and other work; then took the field again between Utica and Cooperstown; in January, 1872, returned to Brooklyn, N. Y., and in the spring went to Michigan as division engineer in charge of surveys and location of the Canada, Michigan and Chicago railroad; appointed chief engineer in June, 1872, but resigned in October, and returned to Brooklyn; a few weeks later went back to Michigan and made the final estimates of the work done; December, 1872, to July, 1880, in Brooklyn; November, 1876, to March, 1878, assistant engineer on construction of Riverside drive, New York city; between 1873 and 1880, besides other work, made surveys, etc., for approaches to Poughkeepsie bridge, for a rapid transit railroad in Westchester county, etc.; since July, 1880, at Bangor, Me., settling and managing his father's estate, and during this time, May, 1882, to August, 1882, in office of Broadway Underground railroad, N. Y. P. O. address, Bangor, Me.

Joseph Phineas Davis, C. E., was from Northboro, Mass. Entered the Institute March, 1855. According to the Register, he has occupied the following positions since graduation; as-

sistant engineer Brooklyn water works, Brooklyn, N. Y.; topographical engineer to the Government of Peru, S. A.; chief engineer of the New Prospect Park, Brooklyn, N. Y.; principal assistant engineer St. Louis water works, St. Louis, Mo.; city engineer, Boston, Mass.; Metropolitan Telephone and Telegraph company, of New York. P. O. address, corner Greenwich and Liberty streets, New York city.

JOHN DAVIS ESTABROOK, C. E., (Fitchburg, Mass.,) son of John and Amada (Davis) Estabrook, was born in Holden, Worcester county, Mass., May 30th, 1837. Attended public schools and academy, entering the Institute March, 1854. Entered upon the work of his profession 1857, on Louisville & Nashville railroad, Ky.; 1859, Council Bluffs & St. Joseph railroad, Ia.; 1860–63, city engineer's office, Boston, Mass.; 1863–64, constructing United States coast defences, Cape Ann and Cape Cod, Mass.; 1864–68, engineer and mine superintendent Little Schuylkill Nov. railroad and Coal company, Tamaqua, Pa.; 1868–79, engineer on construction of Fairmount Park, Philadelphia, Pa.; 1879–82, superintendent of construction and secretary of Union depot, St. Paul, Minn.; 1883–84, chief commissioner of highways, Philadelphia, Pa. Roads and tunnels in Fairmount Park were designed and built under his direction; also Union depot, St. Paul, Minn. Is a member of the R. P. I. Mining Engineers, and Engineers' Club, Philadelphia. Married, 1865, Francis H. Mansfield, who died in 1870; married, 1873, Eliza O. Mansfield, daughter of James Mansfield, of Worcester, Mass. Two children. P. O. address, Germantown, Pa.

GEORGE FREDERICK ELLS, C. E., (Troy, N. Y.), son of Frederick and Nabby (Stimson) Ells, was born in Windham, Greene county, N. Y., November 4th, 1834. Resided in St. Pie, Canada East, some four years before entering the Institute. Studied with Rev. John Smith, of Troy, N. Y., just previous to entering, in 1853. In the spring of 1857 became an assistant on the Burlington and Missouri railroad; then assistant on United States capitol extension, Washington aqueduct, and general post office; July, 1860, resigned position on capitol extension, etc., to engage in manufacturing at Troy, N. Y.; after the breaking out of the war became constructing engineer at the Watervliet arsenal, N.

Y.; made the plans, laid out the work, and superintended the construction of the extensive fire proof shops, also superintended construction of officers' quarters, laboratories, water works, barracks, and other works required; resigned after close of the war, July, 1866, and again engaged in manufacturing, and in this line removed to Long Eddy, Sullivan county, N. Y., in 1869, then to Deposit, Delaware county, N. Y., in 1870; while at Deposit did general surveying, laid out roads, ran town lines, etc.; in 1882 went to Binghamton, Broome county, N. Y., still continuing in the manufacturing business, and so continues to date. Married, June 13th, 1860, Martha M. Goodwin, daughter of Charles Goodwin, of Portland, Me. Five children. P. O. address, Binghamton, Broome county, N. Y.

CHARLES CERYL MARTIN; C. E., (East Smithfield, Pa.,) son of James and Lydia (Bullock) Martin, was born in Springfield, Bradford county, Pa., August 30th, 1831. Attended the Canandaigua Academy, Canandaigua, N. Y., Genesee Wesleyan Seminary and Genesee College, Lima, N. Y. Entered the Institute in 1854. He was for some time principal assistant engineer on the East River Suspension Bridge, and is now superintendent. Is a member of the American Society of Civil Engineers. Married, August 9th, 1859, Mary A. Read, daughter of Gen. Jonathan Read, of Pittstown, Rensselaer county, N. Y. Four children. P. O. address, 22 Sands street, Brooklyn, N. Y.

WILLIAM HENRY MARTIN, C. E., (Ridgway, N. Y.,) son of George W. and Hannah (Newman) Martin, was born in Yates, Orleans county, N. Y., January 29th, 1833. Prepared at Yates Academy, and entered the Institute in 1854. Entered upon the work of his profession October 20th, 1856. Has been contracting on work, nearly all the time since. At present is secretary and treasurer of Copper Queen mining company, of Arizona; office, 37 Wall street, New York city. Is a member of American Society of Civil Engineers. Married, October 1st, 1870, R. E. Adams. One son. P. O. address, 37 Wall street, New York city.

HIRAM FRANCIS MILLS, C. E., son of Preserved Brayton and Jane (Lunt) Mills, was born in Bangor, Me., November 1st, 1836. Attended Bangor High School, and entered the Institute in Sep-

tember, 1853. Entered upon the work of his profession in 1859. Bergen tunnel, Brooklyn water works, and at Cohoes, N. Y., measuring water used by manufacturing companies, 1859 to 1863; at Lowell, Mass., measuring water power and building mills, 1861; making experiments on Concord river, for commonwealth of Massachusetts, 1863 to 1865; in charge of east end of Hoosac tunnel, and designing and building dam across Deerfield river, in Massachusetts, 1865; making preliminary surveys of railroad in Nova Scotia, 1866; made surveys and designs for developing water power of Penobscot river, at Bangor, Me., 1867 to 1869; in Boston doing general hydraulic engineering, 1869 to present time; in Lawrence, Mass., chief engineer of Essex county; having management and control of water power of Merrimac river, measuring the water used by different corporations daily ; experimenting on the flow of water in pipes, barrels and rivers ; designing hydraulic works, and building mills and chimneys. Built Deerfield dam, Pacific mills chimneys, and many hydraulic works. On school committee city of Lawrence three years. Fellow of American Academy of Arts and Sciences. Wrote "Experiments upon Pryometers used in hydraulic investigations ;" "Proceedings of American Academy of Arts and Sciences," Boston, 1878 ; "Experiments upon a Central Discharge Water Wheel." Married, October 8th, 1873, Elizabeth Worcester, daughter of Benjamin Worcester. P. O. address, Lawrence, Mass.

JOHN HENRY QUACKENBUSH, C. E., son of G. V. S. and Hannah A. (Bayeux) Quackenbush, was born in Troy, Rensselaer county, N. Y., February 11th, 1832. Received his preparatory education at various private schools in Troy and elsewhere, including the Collegiate Institute at Poughkeepsie, N. Y. Was clerk in his father's dry goods store, also clerk in the store of William Lee for two years in Troy and three years in Cincinnati, O. Returned to Troy in 1853, and entered the Institute. In the fall of 1856 was engaged on the survey of the proposed extension of the New York & Harlem railroad to Troy, N. Y. From May 15th, 1857, to February, 1858, assistant engineer on the Iowa Central railroad, at first on construction in the eastern part of the State, and later on a preliminaay survey from Boonesboro on the Des Moines river to the Missouri, near Ona-

wa. In 1858, surveyed a coal tract near Wallesville, Ohio, owned by the late E. K. Collins, of the Collins line of steamships. returned to Troy near the close of the year, and since then has not followed his profession. At the opening of the civil war, assisted in raising the Second regiment infantry, New York volunteers, and about April 23d, 1861, was commissioned first lieutenant of company E. From about June 15th, 1861, to January 1st, 1862, was on detached service in the United States signal corps at Fortress Monroe, Va. About January 1st, 1862, was commissioned as captain, and assigned to company C, Second New York volunteers, and held that position till the discharge of the regiment, May 18th, 1863. Was wounded at the battle of Bristol Station, August 27th, 1862, and was brevetted major for services on that occasion. From August, 1864, to April, 1867, was employed in the office of the grain elevator of Messrs. Moore & Covell. From April, 1867, to November, 1876, was engaged in the manufacture of stoves at Troy, N. Y., and since then, until July, 1885, was employed in the dry goods store of G. V. S. Quackenbush & Co. At present, on account of impaired health, is not actively engaged in business. P. O. address, Troy, N. Y.

GILMAN TRAFTON, C. E., was from Warren, Me. Entered the Institute October, 1853. According to the Register, has occupied the following positions; assistant to Smith & Parkenson, engineers, Buffalo, N. Y.; assistant city engineer, Nashville, Tenn.; military railroad engineer, Nashville, Tenn.; civil engineer and member of the Louisville Bridge and Iron company, Louisville, Ky., his present address.

WILLIAM WILLIAMS WALKER, C. E., son of William Ames and Sarah W. (Ingalls) Walker, was born in Middlefield, Otsego county, N. Y., August 8th, 1834. Attended Cortland Academy, Homer, N. Y., Cherry Valley Academy, N. Y., and Brown University, Providence, R. I. Entered the Institute 1853. October, 1855, commenced as rodman in a construction party; was chief engineer of Cedar Rapids & Missouri River railroad in Iowa, from 1860 to 1870, and built 272 miles of road. From 1867 to 1872 was chief engineer and general superintendent Sioux City & Pacific railroad, and built 100 miles of road. From 1869 to

1872 was chief engineer Iowa Falls & Sioux City railroad, and built 174 miles of road. From 1870 to 1872 was chief engineer Fremont, Elkhorn & Missouri Valley railroad, and built 50 miles of road. From 1873 to 1875 was chief engineer and general superintendent Burlington, Cedar Rapids & Minnesota railroad, 400 miles in operation. Erom 1879 to 1884 was president, chief engineer and general superintendent St. Louis, Hannibal & Keokuk railroad. From 1864 to 1873, president First National Bank of Cedar Rapids; 1875 to date, president Cedar Rapids Water company; 1879 to date vice-president Williams Harvester company; president of the United States Central railroad. Married, October 15th, 1857, Mary A. Hitchcock, daughter of N. Hitchcock, Homer, N. Y.; wife died April 28th, 1862; two children. Married, September 7th, 1864, Laura Weare, daughter of John Weare, Cedar Rapids, Ia. P. O. address, Cedar Rapids, Ia.

JOHN ALLSTON WILSON, C. E., (Downington, Pa.,) son of William Hazell and Jane (Miller) Wilson, was born in Phœnixville, Chester county, Pa., April 24th, 1837. Attended school in Philadelphia, 1842 to 1849; private school in Chester county, Pa., 1849 to 1853, during which period he lived with his parents on their farm, following the usual life of a boy in the country, and taking part in the farm work. Entered the Institute October, 1853. In April, 1857, served as topographer on surveys in Central America, for the Honduras Interoceanic railway. In June, 1858, was assistant engineer on the Pennsylvania railroad; in 1860 was promoted to position of principal assistant engineer in charge of construction, which position he held until 1864. During the same time was chief engineer of the Junction and Connecting railroad companies; 1863, was aid on the staff of Gen. D. N. Couch, commander of department of the Susquehanna, and had charge of construction of fortifications at Harrisburg and vicinity; also, rebuilt the Cumberland Valley railroad. March 1st, 1864, was appointed chief engineer for Pennsylvania railroad company, lessee of the Philadelphia & Erie railroad. January 1st, 1868, was transferred to main line of Pennsylvania railroad, as chief engineer of maintenance of way. April 1st, 1874, resigned last named position to accept that of chief engineer of Bennett's Branch railroad, 110 miles long, which road

he located and constructed; also, from April, 1870, to April, 1875, acted as chief engineer for Pennsylvania railroad in charge of construction of branch roads, during which time he constructed the Morrison's Cove branches and the extension of the Tyrone & Clearfield railroad, to Curriersville, Pa. During 1875 was engaged as consulting engineer in construction of centennial buildings in Philadelphia. January 1st, 1876, he became a partner in the firm of Wilson Bros. & Co., civil engineers and architects, at Philadelphia, and is still in the same business. Since 1876 has held positions of chief engineer of North and West Branch railroad, of the Staten Island Rapid Transit railroad, of the Buffalo Run railroad. Since 1873 has been engaged in manufacturing lumber and mining bituminous coal in western Pennsylvania. Designed and had built under his direction Delaware extension of Pennsylvania railroad, including bridge over the Schuylkill river, at the United States arsenal, in Philadelphia; Junction railroad; Connecting railroad; shops, buildings and bridges on Philadelphia & Erie railroad; also on main line of Pennsylvania railroad; Morrison's Cove & Clearfield extension branches of Pennsylvania railroad; Bennett's Branch North & West Branch railroad; Buffalo Run railroad. Member of Franklin Institute, Philadelphia; Engineers' Club, Philadelphia; American Society of Civil Engineers, and American Institute of Mining Engineers. Married, November 4th, 1863, Elizabeth H. Loyd, daughter of the late William Loyd, of Philadelphia. Seven children; six living. P. O. address, 435 Chestnut street, Philadelphia, Pa.

EDMUND YARDLEY, C. E., son of Courtland and Hannah Ann (Brown, niece of Gen. Jacob Brown, war of 1812,) Yardley, was born at Yardleyville, Bucks county, Pa., September 9th, 1836. Prepared at Classical Institute, Albany. Edited and printed a little paper in 1853, in Albany, "The Keepsake," published biweekly. Entered the Institute in 1853. Commenced the practice of his profession in 1856, as rodman North Indiana Air Line railroad, Ligonier, Ind. May to September, 1857, principal assistant engineer on surveys of the then Cincinnati & Mackinaw railroad, Greenville, Darke county, O. April to December, 1859, on Pennsylvania railroad, assistant engineer Pittsburgh division, Pittsburgh. 1864–68, Philadelphia & Erie railroad;

Pennsylvania railroad, lessee ; resident engineer West division, Erie. 1868–70; resident engineer Pittsburgh division Pennsylvania railroad, Pittsburgh. 1870–73, assistant engineer construction Pennsylvania railroad, Altoona, Pa. 1882–83, master of road, Pittsburgh division Baltimore & Ohio railroad, Pittsburgh, Pa. For two months, 1881–82, was assistant engineer L. & N. railroad, Montgomery, Ala. 1858, cashier Toledo freight station, M. S. & N. I. railroad, Toledo, O. 1860–64 ,bookkeeper, &c., wholesale drug house, Toledo, O. 1873–79, in charge of manufacture of baking powder, buying materials, chemical examinations, inventions and experiments, connected with the business. 1880–81, with Albert Fink, pool commissioner. 1884 to present time, general car accountant, Pennsylvania company. Has had under his direction, the details of a number of works connected with his employment on the Penusylvania railroad. He had immediate charge as assistant engineer of the construction of a portion of the Pittsburgh shops, in 1859. Had general charge of the construction of the machine shops, at Erie, and part of the time those at Kane on the Pennsylvania railroad. Had immediate charge of the construction of the new car shops at Altoona, 1870–73 ; the Altoona passenger depot, &c. These works were generally designed in the office of the chief engineer, but the details, the foundations, the sewerage, the heating and ventilation, and in some cases important changes in design, were made by Mr. Yardley, with his approbation. The water supply at Grapeville and Spring Hill, involving ideas entirely novel to such works, on the Pennsylvania railroad, the former consisting of a dam 13 feet high, a pipe line of a mile in length, lower reservoir, stand pipe, &c., with surveys of the country and plans for future extension, were designed and built by him. His principal duties have been those of superintendent of the track forces however, with the title of resident engineer or master of road, as the case may be. Member of American Society of Civil Engineers. Wrote an article in Drinker on Tunneling, giving details and cost of arching Carr's tunnel, about 1877 ; paper on cements, American Society Civil Engineers, 1872 ; articles in the public press, 1879, contending for and elucidating the harmlessness of alum as an ingredient in baking powder ; memorial to Legislature of the state of New York on

the same subject. Married, May, 1861, Louise A. Mosher, daughter of Zebulon Mosher. Five children; three living. P. O. address, 435 Chestnut street, Allegheny, Pa.

CLASS OF 1857.

FREDERICK YEAMANS DABNEY, C. E., (Richmond, Miss.,) son of Augustine Lee and Elizabeth O. (Smith) Dabney, was born in Fredericksburg, Spottsylvania county, Va., March 22d, 1835. Had no special preparation beyond an ordinary country school training. Entered the Institute 1854. Entered upon the work of his profession 1857, on the Southern railroad (now V. & M. railroad,) extension building; Gulf & Ship Island railroad surveys, 1859–60; Mississippi Levees, 1866–67; North Missouri railroad building, 1868; Decatur & Aberdeen surveys, and Natchez & Jackson surveys, 1869; New Orleans, Jackson & Great Northern railroad, (now C., St. L. & N. O. railroad,) 1870–75; New Orleans Pacific railroad, 1876–79; Vicksburg, Shreveport & Pacific railroad, 1880–84. Engaged on other roads for short periods of time. From 1861 to 1865 was in the Confederate States service, chiefly in the artillery service and the engineer corps. Most of the location and grading of the New Orleans & Pacific railroad was done under his personal supervision. The extension of the Vicksburg, Shreveport & Pacific railroad is now being done under his direction. Was captain of engineers C. S. A., and had charge of the defenses of Port Hudson before and during the siege. Is now chief engineer and superintendent of the Vicksburg, Shreveport & Pacific railroad. Is a member of the American Society of Civil Engineers. Married, May 24th, 1865, Agatha Ann Moncure, daughter of Dr. John Edwin Moncure. Seven children. P. O. address, Monroe, La.

ROBERTO ESCOBAR, C. E., son of Buenaventura and Aguileria (de Castro) Escobar, was born at Bayamo, Island of Cuba, November 19th, 1836. Prepared at Penguet School, Bank street, New York, and entered the Institute 1856. Was first assistant engineer Cardenas & Jucaro railroad (Cuba) for six months in 1857. During 1860 was on hydrographical survey of the harbor of Trinidad, Cuba. 1861–63 he was first assistant engineer in

charge of topographical survey of the city of Havana and surroundings. 1864–66 was city engineer of Havana. 1867 was professor of mathematics and surveying at College of Surveyors and Builders, of the city of Havana. In same year was on a government mission to Paris, France. In 1868 was chief engineer Caibarien & Santo Esperito railroad, Cuba. In 1870 was employed for two months on survey of Little Rock & Fort Smith railroad. 1871–74 was employed by Charles Macdonald, C. E., as first assistant engineer in construction of bridges. From 1875 to 1883 was engineer in charge designing of bridges, Delaware Bridge company. 1884–85 was employed by the Union Bridge company, 18 Broadway, New York, in the same capacity. Is a member of the Society of Civil Engineers. Married, October 18th, 1865, Maria de los Dolores Trigo, daughter of Jose Dominigo Trigo. Four children. P. O. address, care of Union Bridge Co., 18 Broadway, New York city.

TIMOTHY ORLANDO HOPKINS, C. E. *See Assistant Professors, page 163.*

GEORGE FREDERIC KIRBY, C. E., was born at Bainbridge, N. Y., May 22d, 1836. Entered the Institute 1854. Has followed engineering as a profession intermixed with private affairs. Engaged in banking and developing quarries in Iowa and Illinois. Had charge of constructing a railroad bridge over the Mississippi river at Clinton, Ia., on the Chicago & Northwestern railway; constructed the major part of their line in Iowa, and was in their employ as engineer and superintendent for about seven years; had charge of the construction of the Mobile & Ohio railroad, in Northern Mississippi, previous to the war; was on land grant railroad survey of Minnesota; superintendent of Central railroad of Iowa two years, and left the profession on account of poor health and personal affairs. Married, June 3d, 1868. P. O. address, 434 West Adams street, Chicago, Ill.

GABRIEL LEVERICH, C. E., was born in 1835, at Wellsburgh, N. Y. After graduating, remained at home for some time, and was then employed in the Trenton, N. J., Locomotive Works, where he superintended the manufacture of machinery for making guns. Engaged in development of apparatus for destructive distillation of wood, compression of peat, tram-car propulsion,

and the manufacture of heavy ordnance. He was then appointed assistant engineer on the East River bridge, a position which he still holds. Member of American Society of Civil Engineers of which he was secretary for some years. P. O. address, 22 Sands street, Brooklyn, N. Y.

CHARLES MACDONALD, C. E. See *Trustees, page 112.*

JOHN OSTROM, A. B., C. E., son of David I. and Maria Ostrom, was born at Watervliet, Albany county, N. Y., July 23, 1832. Graduated from Williams College, Mass., in 1854, and entered the Institute in 1855. Entered upon the work of his profession in October, 1857; was engaged in civil engineering in California and Nevada. He settled in Virginia City, Nev., where he was successful and popular, and was nominated by the Democratic party for those offices for which he was peculiarly qualified by his professional education. He died April 14th, 1866, and was buried in Virginia City, Nev.

WILLIAM MCLAIN PRATT, C. E., (Meriden, Conn.,) son of Julius and Lydia (De Wolf) Pratt, was born in Meriden, New Haven county, Conn., December 12th, 1837. Attended Williston Seminary, East Hampton, Mass., and entered the Institute 1855. Soon after graduating, he engaged in manufacturing at Meriden, Conn. Entered the army in 1862, and served as private, second lieutenant, adjutant, aide-de-camp, major, and lieutenant colonel. After the war engaged in manufacturing at Meriden, Conn., but gave up business on account of ill-health, and went to Minnesota in 1871. Since 1877, has been most of the time in the Black Hills of Dakota, engaged in mining and lumbering. Married, October 7th, 1869, Sophia Penfield Rand, of Catskill, N. Y. Three children; one living. P. O. address, Mankato, Blue Earth county, Minn.

WASHINGTON AUGUSTUS ROEBLING, C. E., (Trenton, N. J.,) son of John Augustus and Johanna (Herting) Roebling, was born in Saxonburgh, Butler county, Penn., May 26th, 1837. He attended Trenton Academy, and entered the Institute in May, 1854. He entered upon the work of his profession in July, 1857, on the Alleghany suspension bridge. Entered the army in 1861 and fought in all the battles of the army of the

Potomac until the close of the rebellion. Worked on the Covington and Cincinnati suspension bridge from 1865 to 1867; designed and built the East river suspension bridge, January, 1869, to May, 1883; wrote book on "Military Suspension Bridges;" pamphlet on "Transmission of Power by Wire Ropes," and numerous other small pamphlets. Married January 18th, 1865, Emily Warren, daughter of Sylvanus Warren, of Cold Spring, N. Y. P. O. address, Trenton, N. J.

FRANCISCO MARIA JRUTO TRUJILLO Y CRESPO, C. E., son of Joaquin and Maria Teresa Crespo Trujillo, was born at Havana, Cuba, May 28th, 1838. Attended the San Anacleto College, 1845 to 1849; Tarrytown, N. Y., 1849 to 1854. He entered the Institute in September, 1854. From 1858 to 1862 was assistant engineer Ferio Carielde le Bahia a' Matanzas; from 1858 to 1862 assistant engineer for Plan of Havana; from 1864 to August 29th, 1873, on which day he died, assistant engineer in company of Caminus de Sierro de le Habana. He built all the structures of the Bahia & Matanzas railroad. Married, February 7th, 1865, Isabel Crespo y Arango. He was exemplary in conduct, and was considered very highly both as an engineer and a gentleman.

HEZEKIAH WATKINS, C. E., A. M., LL. B., (New York City) son of John Daniel and Harriet (Young) Watkins, was born in Liberty, Sullivan county, N. Y., August 24th, 1835. Prepared under John F. Stoddard, of Liberty Normal Institute and Wesleyan University, Middletown, Conn. He entered the Institute in September, 1855. Entered upon the study of law in 1859; was admitted to the bar in 1861, and commenced practice at Monticello, N. Y., where he remained until 1862, when he enlisted in the army. Was two years at Wesleyan University, and graduated from Yale College with salutatorian honors in class of 1859. He held no civil office except that of railroad commissioner, to which he was appointed to examine certain portion of the Northern Pacific railroad, which appointment he held at the time of his death. He, with H. R. Low, organized the One Hundred and Forty-third regiment, N. Y. Vols., of which he enlisted as captain of company H. He was promoted to major, and after to lieutenant-colonel, and commanded the

regiment on Sherman's march to the sea. He was wounded at Bentonsville, and brevetted colonel for gallantry in that battle. After the war he continued the practice of law in New York city until his death. Married, in January, 1873, Elizabeth Fitzhue, daughter of Charles Fitzhue, of Bay City, Mich. Three children, Gertrude, Fitzhue and Elizabeth, who survive both parents. The mother died in the spring of 1879 and Mr. Watkins in February, 1884.

DE VOLSON WOOD, C. E., M. S., A. M. *See Instructors, page 167.*

CLASS OF 1858.

JAMES CAMPBELL COIT, A. B., C. E., (Cheraw, S. C.,) son of David G. and Maria (Campbell) Coit, was born October 4th, 1832, in Marlboro county, S. C. Attended three years South Carolina College, one year at Princeton, N. J., where he graduated with the class of 1854. Practiced profession of engineering until the beginning of the war. Served in the Confederate Army during the war, in command of a battalion of field artillery. Since the war has been engaged in planting. Elected a member of the State Legislature 1867, 1874, 1876–78. Elected by the Legislature commissioner to examine the condition of the bonded debt of the State, November, 1877. In November, 1878, was elected by the Legislature commissioner of the Court of Claims. November, 1879, was appointed by Legislature special commissioner to examine and pass upon the bonded debt of the State. November, 1880, was elected Comptroller General of the State. Married, November 22d, 1867, Sarah E. McLean, daughter of Dr. M. McLean, of Cheraw, S. C. Six children. P. O. address, Cheraw, S. C.

THEODORE COOPER, C. E., (Cooper's Plains, N. Y.,) son of John and Elizabeth M. (Evans) Cooper, was born in Cooper's Plains, Steuben county, N. Y., January 12th, 1839. Prepared at the country schools and John Vanderveer's Academy, Easton, Penn., and entered the Institute in 1855. Engaged in miscellaneous work of surveying in 1859–60; winter and spring of 1861, rodman on Troy & Greenfield railroad and Hoosac Tunnel. En-

tered the United States navy as third assistant engineer in December, 1861; promoted to second assistant engineer December, 1863. Was ordered to duty on board United States steamship Chocura January, 1862; was detached and ordered to report for duty at Naval Academy June, 1865; August 14th detailed for duty as instructor in steam engineering at Naval Academy, Annapolis, Md.; remained on duty as instructor and in charge of civil engineering work at Naval Academy until February, 1868, when he was detached and ordered to the United States steamship Nyack, South Pacific squadron; detached from United States steamship Nyack May 11th, 1870; promoted, September, 1870, to first assistant engineer, with commission dating back to October 11th, 1866; ordered to Naval Academy September, 1870; at his request detached October, 1870, and granted a furlough; ordered to Naval Academy June, 1872, and resigned from naval service July, 1872. In the spring of 1872 he was appointed inspector of the St. Louis bridge under Captain Charles B. Eads, chief engineer, and remained with this company as inspecting engineer for manufacture of steel, construction of the work at Keystone Bridge shops, and finally for the erection of the bridge. After the completion of the bridge and tunnel he was made superintending engineer of the Bridge and Tunnel Company. In June, 1875, he resigned to take charge of the shops of the Delaware Bridge Company, Phillipsburgh, N. J., remaining in charge until the shops were closed in 1876. September, 1876, he opened an engineer's office in St. Louis, with Col. Henry Flood. He worked up, in connection with Col. Flood, a plan for Blackwell's Island bridge, East River, N. Y., and submitted it for competition, securing the third prize; November, 1876, went to Phœnixville to inspect the Logansport bridge; February to July, 1877, he engaged in a thorough inspection of all the iron bridges of the Erie railroad. For the balance of the year he was employed by Charles Macdonald to design and construct the double deck fire shed for the National Steamship Company, pier 59, North River; on its completion, in January, 1878, chief inspector; in charge of construction New York Elevated railroad; resigned March 1st to take position of assistant general manager of Keystone Bridge Company, Pittsburgh; resigned September 1st and returned to New York city. From November, 1878, to April, 1879,

he was expert and consulting engineer on joint structures of New York & Metropolitan Elevated railroads. At this time he drew up for the Erie railroad general specifications for iron specifications for iron bridges, since known as the Erie specifications, and adopted very generally upon many other railroads. In April, May and June he engaged with Charles Macdonald in building Coney Island pier; November, 1879, opened an engineering office at 351 Broadway, New York, and since that time has been doing a general business as consulting engineer, devoting himself more especially to bridges, wharves, buildings, piers, foundations, etc. Member of American Society of Civil Engineers. Has written and published numerous miscellaneous articles in newspapers, magazines and the transactions of the American Society of Civil Engineers; general and detailed specifications for numerous railroad companies, notably the Erie railroad, Pittsburgh, McKeesport & Youghiogheny railroad, South Peura, Lehigh Valley railroad, Pittsburgh Junction, railroad, etc. P. O. address, 35 Broadway, New York city.

WILLIAM HOWARD DOUGHTY, C. E. *See Secretaries, page 54.*

ALBERT HAMILTON EMERY, C. E., (Mexico, N. Y.,) son of Samuel and Catharine (Shepard) Emery, was born in Mexico, Oswego county, N. Y., June 21st, 1834. Prepared at district schools and Mexico Academy. Worked at farming some years; taught district school in the winter of 1852–53; worked at farming and railroad surveying in 1853 and 1854. Entered the Institute January, 1855. Was assistant in drawing in 1858. Entered upon the work of his profession July, 1858, mainly in New York city. Designed and erected a church steeple at Mexico, N. Y., immediately after graduation; then commenced inventing and developing his inventions. Was employed for six months in 1861–62 as assistant to Gen. Richard Delafield, in charge of the defences of New York state and harbor. Spent some three years in study and experiments in ordnance and projectiles, and four or five years in designing and building power presses, and in developing and perfecting a new process and apparatus for distilling resinous woods. Is vice-president and engineer of the Emery Scale company, organized April, 1882, owned and operated by the Yale & Towne Manufacturing company,

of Stamford, Conn., builders of scales, guages, testing machines and dynamometers. He invented, designed and built the government testing machine at Watertown Arsenal, Watertown, Mass. Received the Grand Medal of Honor awarded by the Massachusetts Charitable Mechanics' Association, through the American Academy of Arts and Sciences, for that exhibit most conducive to human welfare, the testing machine at Watertown Arsenal. Married, March 3d, 1875, Mrs. Fannie B. Myers, daughter of Frederick A. King. Two children. P. O. address, Stamford, Conn.

CLARK FISHER, C. E., (Trenton, N. J.) son of Mark and Virtue E. (Gage) Fisher, was born in Levant, Penobscot county, Me., May 27th, 1837. Prepared at Trenton Academy, and entered the Institute in 1855. In 1860 entered the United States navy as assistant engineer; was then made second assistant engineer, first assistant engineer and chief engineer, ranking as lieutenant commander United States navy until 1873. Designed and built gunboats, double enders and sloops of war machinery, and was on supervising duty at various United States navy yards. Member of American Society of Civil Engineers, American Institute of Mining Engineers. At present proprietor of the Eagle Anvil Works and of the Fisher Rail Joint Works. P. O. address, Trenton, N. J.

HENRY HARLEY, C. E., (Cincinnati, O.,) son of John and Emily (Kimball) Harley, entered the Institute September 26th, 1855. Soon after graduation, entered upon the work of his profession and in 1860 was principal assistant engineer Troy & Greenfield railroad, Hoosac Tunnel; 1862, merchant in Pittsburg, Pa.; 1870, merchant in New York city, and has been connected with various business enterprises. P. O. address, Cincinnati, O.

GEORGE HUNT, C. E., (San Francisco, Cal.,) entered the Institute February 26th, 1856. In 1860 was draughtsman to the city assessor, San Francisco, Cal., and for many years civil and mining engineer, Gold Hill, Nev. Deceased.

JOSEPH MOSS KNAP, C. E., (Brownville, N. Y.,) son of Thomas L. and Mary (Averill) Knap, was born in Brownville, Jefferson county, N. Y., December 30th, 1837. Prepared at the public

and select schools of Brownville, and entered the Institute September, 1854. Took a situation as book-keeper in Prescott, Canada, October, 1858. Assistant engineer under John M. Wilson, C. E., Pennsylvania railroad, Altoona, Pa., spring of 1859. Removed to Pittsburgh, Pa., same year, and accepted position of assistant superintendent of the Hiawatha nut and bolt works; was made superintendent in the fall of 1860. Joined the Union army in July, 1861, and served most of the time in the artillery until August, 1864. Was connected with the Fort Pitt foundry, Pittsburgh, from 1864 until January, 1872. Spent about six months in Europe in 1872, as agent for the sale of ordnance. Engaged in blast furnace and mining industries in Westmoreland and Fayette counties, Penn., from September, 1872, until January 1st, 1878, and in mercantile pursuits in New York city from 1878 to present time. Built Greenlief narrow guage railroad, Fayette county, Pa. Was school director, 1877, Westmoreland county, Pa. At the battle of Antietam, Md., September 17th, 1862, being in command of a Light Battery, Pennsylvania Volunteers, he learned from a confederate prisoner that the battery opposing his at one stage of the fight was commanded by Capt. Coit, of South Carolina, a classmate at the Institute. Member American Society Mining Engineers, American Society of Civil Engineers. Married, September 1st, 1864, Sophie Hale Day, daughter of the late Edgar Burr Day, of Catskill, N. Y. Three children. P. O. address, 365 West street, New York city.

WILLIAM METCALF, C. E., (Pittsburgh, Penn.,) son of Orlando and Mary M. (Knap) Metcalf, was born in Pittsburgh, Allegheny county, Penn., September 3d, 1838. Prepared at ordinary day schools in Pittsburgh, and entered the Institute in September, 1854. August, 1858, he entered Fort Pitt foundry, Pittsburgh, and had charge through the war, making heavy guns and projectiles. In February, 1867, he joined the firm of Miller, Barr & Parkin, Crescent Steel Works, Pittsburgh, manufacturers of crucible cast steel, mostly of finer grades of tool steel. The present style of the firm is Miller, Metcalf & Parkin. Member of the American Society of Civil Engineers; is now a director; American Institute of Mining Engineers; two years in council and one year president; American Society Mechanical Engi-

neers; one year vice-president; Engineer's Society, Western Pennsylvania; first two years president. Edited papers in transactions of all of the above societies except the American Society Mechanical Engineers. Married, December 1st, 1864, C. D. Fries, daughter of A. Fries. Six children. P. O. address, Pittsburgh, Penn.

HENRY WALTER MERIAN, C. E., was born in Brooklyn, N. Y., December 31st, 1839. He entered the Institute in 1856. On returning to Brooklyn he entered the engineer department of the Ridgewood Water Works in Brooklyn, and was actively engaged in surveying until the beginning of the civil war, when he joined a New York volunteer regiment for three month's service on the upper Potomac. After his return he was admitted to the United States navy, engineer's department, in 1862, and after some service in the Brooklyn Navy Yard was appointed third assistant engineer to the United States monitor Weehawken, and left in her for Port Royal, S. C., on January 19th, 1863; thence for Warsaw Sound, Ga., where, on June 17th, 1863, the Weehawken had the good fortune, single-handed, to capture the rebel ram Atlanta. In July, 1863, she proceeded to Charleston harbor, and for four months was actively employed in shelling Fort Sumter, Fort Moultrie, etc. On December 6th, 1863, while at anchor in the bay, she foundered, and three of her engineers then on duty in the engine room lost their lives, one of whom was Henry W. Merian. He died in the service of his country at the age of 23 years and 11 months, universally regretted by all who knew him. In 1872, some of the remains of the lost ones on board the Weehawken were recovered, brought by order of the navy department to the Brooklyn Navy Yard, and there committed to earth with military honors.

ARIO PARDEE, JR., C. E., son of Ario and Elizabeth (Jacobs) Pardee, was born in Hazleton, Luzerne county, Pa. Entered the Institute September 28th, 1855. After graduation, was engineer and superintendent of coal mines, Hazleton, Pa. Near the beginning of the war entered the army, and served as colonel of United States infantry volunteers. He is now president of the Allentown Rolling Mill company. P. O. address, 237 South Third street, Philadelphia, Pa.

GEORGE HENRY PIERCE, C. E., was born at Richmond, Richmond county, Province of Quebec, July 4th, 1835. Fitted for college at the Charleston High School and St. Johnsbury (Vt.) Academy. Entered the Institute in 1855. After graduation he immediately entered upon professional duties on the Grand Trunk railway, in connection with the Victoria Bridge. Has since been connected with various other railways. In 1863 became interested in mining, and continued until 1870, when he retired to his farm at Beechmore. P. O. address, Richmond, Province of Quebec, Canada.

JOSEPH GUSTAVUS RICE, C. E., (Canajoharie, N. Y.,) was born in Salina, N. Y., August 15th, 1835. He entered the Institute September 27th, 1855. Began business life as a civil engineer upon the Benecia & Marysville railroad in California. He was employed for several years as mining engineer and superintendent of extensive silver mines in Mexico, and subsequently in the same capacity upon the Mariposa or Fremont estate in California. He was skilled in his profession. He died suddenly, of pneumonia, March 19, 1872, at Pioche, Nevada.

LEWIS FREDERICK RICE, C. E., son of Lewis and Susan Augusta (Brigham) Rice, was born in Boston, Mass., May 17th, 1839. Prepared at Boston Public Latin School and Kingsley's Classical Mathematical School, West Point, N. Y., and entered the Institute September 26th, 1855. He began professional work as an assistant on the Brooklyn water works, March, 1859, remaining there until April, 1860; was assistant engineer on Troy & Greenfield railroad, in Massachusetts, until September, 1861. In the army as lieutenant, captain and major of Thirty-first Massachusetts volunteers, infantry, from February, 1862, to October, 1865. In private practice in Boston during 1866. He was assistant on the Reading & Columbia railroad, in Pennsylvania, during the first part of 1867; assistant engineer of the St. Louis water works extension from August, 1867, to September, 1871, with intermission of two or three months, during which he held the nominal position of chief engineer of Wells Valley railroad, of Alabama. In private practice as architect and civil engineer in Boston from 1872 to date. Member of the Engineer's Club, of St. Louis, and Boston Society of Civil En-

gineers. He made reports and plans for water works for Lowell, Mass., 1866; Lawrence, Mass., 1872; Rockland, Me., 1876; Farmingham, Mass., 1882. Also, reports and plans for sewerage for Lawrence, Mass., 1874; Portsmouth, N. H., 1878; Plymouth, Mass., 1880. Married, October 25th, 1867, Caroline Elizabeth Ellis, daughter of Charles Draper Ellis. Two children. P. O. address, 9 Pemberton Square, Boston, Mass.

RICHARD PENNEFATHER ROTHWELL, C. E., M. E., son of John and Elizabeth (Garnett) Rothwell, was born at Ingersoll, Ontario, Canada, May 1st, 1837. He studied in several schools, and for a year was a student at Trinity College, Toronto, Ont. Entered the Institute in 1855. After graduating he went to the Imperial School of Mines, Paris. He finished the three years course in two years, and then went through the mining districts of Europe, and part of the year 1861 he took the practical course of mining and ore dressing at the Frieberg Mining School, Saxony. His first professional engagement was in W. T. Henly's telegraph cable works, North Woolwich, London, England, in 1862–63. Was assistant engineer silver, lead and copper mines near St. Maurice, Hautes Alpes, France, 1863; then reported on mineral property in various parts of Canada. In 1865 he opened an office in Wilkes Barre, Penn., and remained there until 1863, having engineering charge of a number of collieries, opening mines, erecting mine work and making extensive contour topographical surveys in several states from Massachusetts to the Gulf. In 1873 he removed to New York city and assumed the editorial management of the *Engineering and Mining Journal*. He still holds that position, and practically owns the paper. Since 1873 he has carried on his professional work, examining mines and managing mines in all parts of the United States and Canada, and also in Europe and the West Indies. For the past three years most of his time has been occupied opening gold mines (in which he is largely interested) in Canada, and in working out the problem of the extraction of gold from gold bearing arsenical pyrites. Member of the Geological Society of France, Paris; North of Engiand Institute of Mining and Mechanical Engineers, and honorary member of the St. Petersburgh Chemical Society, Russia. He organized the American Institute of Mining Engineers, in

Wilkes Barre, and was president of the American Institute of Mining Engineers from 1882 to 1883. Member of the American Society of Civil Engineers. He has written considerable for technical periodicals, besides editing the *Engineering and Mining Journal*, *Polytechnic Review*, etc. Married, in 1861, Bertha Hillebrand. One child. P. O. address, 27 Park Place, New York.

JAMES GARDNER SANDERSON, C. E., (Scranton, Penn.,) son of George and Marion B. W. (Kingsbury) Sanderson, was born in Towanda, Bradford county, Penn., February 5th, 1840. He received private instruction, preparatory to entering the Institute, from Prof. Colburn, professor of mathematics at the Susquehanna Collegiate Institute, and entered the Institute September 25th, 1855. Entered the Fulton Iron Works, New York city, in the fall of 1858, intending to prepare for entering the engineering department of the navy. He was taken seriously ill that winter, followed by a long confinement and necessary abandonment of all physical labor for several years. No work of an engineering character was undertaken until 1868, when he surveyed and laid out the addition to the city of Scranton, Penn., known as Green Ridge, and built a street railway through Scranton, Green Ridge and Providence, constructing a bridge across the Lackawana river at Green Ridge for this road and for street traffic. He afterward became interested in the development of electric signals for railways and the manufacture of Portland cement at the works of the Wallkill Portland Cement Company, at South Rondout, N. Y. Member of the American Society of Civil Engineers. Married, July 17th, 1860, Eliza McBrair, daughter of the late George P. McBrair, of New York city. P. O. address, Scranton, Penn.

JOSEPH MILLER WILSON, C. E., A. M., (Downington, Pa.,) son of William Hasell and Jane (Miller) Wilson, was born in Phœnixville, Chester Co., Pa., June 20, 1838. Studied in a family school under private teachers, and entered the Institute September, 1854. After graduation, studied analytical chemistry for two months with Prof. F. A. Genth in the city of Philadelphia. In the summer of 1859 did some engineering work on the line of the Pennsylvania railroad, and regularly entered the service of this company in March, 1860, as assistant engineer. In 1863

was resident engineer on the middle division, and in 1865 principal engineer over the whole road, in special charge of bridges; title afterwards changed to engineer of bridges and buildings. Residence from 1860 at Altoona, Pa.; in 1867 moved to Philadelphia with office; still holds this position, which covers all the lines of the company from New York on the east to Pittsburg and Erie on the west, and from Canandaigua on the north to Quantic, Va., on the south. Also engineer of bridges and buildings on the Philadelphia, Wilmington & Baltimore railroad. In 1873 entered into competition for plans for the Philadelphia Centennial Exhibition Building; was selected as one of the first ten, and afterwards engaged in the second competition and gained a premium. In conjunction with Henry Pettit, he made designs and took charge of the erection of the main exhibition building and machinery hall, as engineers and architects. January, 1876, in connection with his brother, John A. Wilson, organized the firm of Wilson Bros. & Co., civil engineers and architects, Philadelphia, which firm is still in existence. Has been engaged as an expert on the approaches of the Brooklyn bridge, and various other works. Of the various bridges and buildings designed and built by him, may be mentioned the Susquehanna bridge, Schuylkill bridge, Philadelphia; Trenton bridge, New Brunswick bridge, etc.; Broad Street Station, Pennsylvania railroad, Philadelphia; Baltimore and Potomac Station, Washington, D. C.; Weehawken Station, New York, West Shore & Buffalo railroad; a large number of stations for the latter road, &c. Was made Master of Arts by the University of Pennsylvania in 1867. Received medals and awards at Centennial International Exhibition, for plans of bridges and buildings; also, for the main exhibition building and machinery hall. Member of Institution of Civil Engineers, London, Eng., American Society of Civil Engineers, Fellow of American Institute of Architects, member of Franklin Institute (manager since 1868); member of American Philosophical Society; trustee and member of executive committee of Pennsylvania Museum and School of Industrial Art; member of Photographical Society, Philadelphia. Wrote the "mechanical and scientific," and the "historical" parts for the illustrated catalogue for the International Exhibition of 1876, published by Gebbia & Barrie, Philadelphia, 1876–78; also, sundry papers at different times, for scientific and en-

gineering journals. Has two brothers civil engineers, graduates of the Institute; his father is a prominent civil engineer, for very many years connected with the Pennsylvania railroad; his grandfather was an engineer, and laid out a part of the original line, now the Pennsylvania railroad; his great-grandfather was a military and civil engineer in Scotland; his great-great-grandfather was an engineer and architect in Aberdeen, Scotland. Married, May 24th, 1869, Sarah Pettit, daughter of the late Judge Thomas McKean Pettit. Two children. P. O. address, 435 Chestnut street, Philadelphia, Pa.

CHARLES WILLIAM WINSLOW, C. E., (Lahaina, Sandwich Islands,) son of Charles Frederick and Lydia (Jones) Winslow, was born in Nantucket, Nantucket county, Mass., July 22d, 1839. Entered the Institute preparatory class, now division D, September 27th, 1854, and entered the Institute September, 1856. Resided in Nantucket to 1843; Sandwich Islands, 1834–48; Nantucket, 1848–51; Boston, 1851–53. Was assistant engineer July, 1858, on Troy & Greefield railroad; Atlantic & Great Western railroad, location and construction from October, 1858, to the fall of 1862, and until January, 1866, assistant auditor Atlantic & Great Western railroad; assistant auditor Erie railway, and auditor for receiver of Atlantic & Great Western railroad from January, 1869, to August 31st, 1871; auditor Atlantic and Great Western railroad (re-organized) from September 1st 1871, to October 31st, 1872. During the intervening time to May, 1878, was agent and commissioner for freight pools of various railways running east from St. Louis. From June 1st, 1878, to present time auditor of Hannibal & St. Joseph railroad company. Married, January 20th, 1863, Isadore B. Keeler, daughter of Salmon I. Keeler, of Jamestown, N. Y. P. O. address, Hannibal, Mo.

CLASS OF 1859.

ALEXANDER JOHNSTON CASSATT, C. E., (Philadelphia, Penn.,) son of Robert Simpson and Katherine (Kelso)Cassatt, was born in Pittsburgh, Allegheny county, Penn., December 8th, 1839. From 1851 to 1856 he attended private schools in Paris, France,

Heidelberg and Darmstadt, Germany. He entered the Institute in January, 1857. From March to December, 1861, was assistant engineer on the Dalton & Jacksonville railroad, Georgia, (afterward the Selma, Rome & Dalton railroad); March, 1861, to October, 1882, was in service of Pennsylvania railroad company as rodman, assistant engineer, resident engineer, assistant general superintendent, superintendent of motive power and machinery, general superintendent, general manager, third vice-president and first vice president. Present occupation, farmer. Married, November 25th, 1868, Lois Buchanan, daughter of Rev. E. J. Buchanan, D. D. Four children. P. O. address, Haverford College, Montgomery county, Penn.

Jose N. Casanova, B. S., Cardenas, Cuba, entered the Institute September 17th, 1856. After graduation he returned home, and later held a government position in Washington, D. C.

Walter Crafts, C. E., son of Nathan and Relief (Witherly) Crafts, was born in West Newton, Middlesex county, Mass., January 21st, 1839. Prepared at West Newton Model School, English and Classical School, West Newton, and entered the Institute September, 1856. From 1860 to 1862 was at mining school, Freiberg, Saxony; 1862–65, in charge of copper mining operations in Lake Superior district; 1866–70, in charge of iron mines, West Stockbridge, Mass.; 1870–76, superintendent Shelby iron works, Alabama; 1877–83, treasurer and manager of the Crafts Iron company, Greendale, O.; 1883 to date, vice-president of Columbus & Hocking coal and iron company, Columbus, O. Married, June 1st, 1873, Phebe A. Alcott, daughter of Dr. William A. Alcott, of Auburndale, Mass. Three children. P. O. address, Columbus, O.

Ormond W. Follin, B. S., (Charleston, S. C.,) entered the Institute September, 1854. After graduation, he spent some time in the South, and then for a few years his headquarters were in Troy. He was afterward a stock raiser in Idaho. Later, he went to San Francisco and was agent of the Pacific Mail Steamship company, stationed at some post on the Isthmus of Panama. His first wife was Jessie Dauchy, daughter of Charles Dauchy, of Troy, N. Y.; one son, Maynard D. Follin, Detroit, Mich. He married again, about 1880, was residing in the inte-

rior of Florida; afterward in San Jose de Gautemala, Central America.

ALBERT SULLIVAN GREENE, C. E., son of Joseph Lankford and Susanna (Maxson) Greene, was born in Adams, Jefferson county, N. Y., August 3d, 1838. Prepared at Adams Seminary and the Institute Training School, Prof. J. T. Allen, B. S., and entered the Institute in November, 1856. January, 1860, he was examined for position of third assistant engineer, United States navy, and received the appointment February 17th. Was ordered to duty on board United States steamship Susquehanna July, 1860; July, 1861, detached from Susquehanna and ordered to duty in navy department, Washington, D. C.; remained on duty in department until January, 1868, since which time he has been on duty in various squadrons and shore stations. Was made chief engineer in the navy, to date from March 2d, 1866, and duty since has been in that grade. He was engaged in the design and trial of the machinery of various vessels in the navy, and in charge of various experiments in engineering and physical science made by the Bureau of Engineering in Washington. Member of the Franklin Institute, of Philadelphia, Penn. Married, July 12th, 1864, Elis Story, daughter of the late William Story, of Indiana. Two children; one living. P. O. address, care Navy Department, Washington, D. C.

GEORGE M. GREENE, C. E., (Lebanon, N. H.,) entered the Institute September, 1856. In 1860 he remained at Glenmore, near Troy, as civil engineer. In 1862 was third assistant engineer in the United States navy, steamer Montauk. In 1864 he held the same position in the Bureau of Steam Engineering, Washington, D. C. In 1874, passed assistant engineer. Deceased.

THEODORE IGNATIUS HEIZMANN, C. E., son of Charles Laurence and Mary Cecelia (Eichorn) Heizman, was born in Reading, Berks county, Penn., December 14th, 1838. He attended the private schools at Reading, and was a student at Mt. St. Mary's College, Emmettsburg, Md., two years before entering the Institute, which was in the fall term of 1856. He entered upon the work of his profession in September, 1859, as an assistant to the topographer on the preliminary survey of the Reading &

Columbia railroad, which work was completed during the month. In December, 1859, he was employed in the same capacity on the survey of a line between Easton & Nazareth, completed the same month. March, 1860, he entered the service of the Pennsylvania railroad; March, 1861, was made assistant engineer; March, 1864, principal assistant engineer; February, 1865, resident engineer middle division Harrisburg to Altoona, office at Altoona; January, 1868, resident engineer Philadelphia division, Philadelphia to Harrisburg, with office at Philadelphia; April, 1870, engineer maintenance of way, main line, Philadelphia to Pittsburgh, with office at Altoona; January, 1872, chief engineer maintenance of way of all lines of the Pennsylvania railroad between Pittsburgh and New York, with office at Philadelphia. In August, 1874, he resigned, and since that time has not engaged, professionally or otherwise, in any work. He has spent considerable time abroad. P. O. address, 19 South Sixth street, Reading, Penn.

JAMES R. PERCY, C. E. *See Instructors, page 168.*

HARRISON AUGUSTUS ROYCE, C. E., (West Newton, Mass.,) son of Augustus E. and Elizabeth (Taylor) Royce, was born in Hartford, Conn., March 21st, 1840. Prepared at English and Classical School, West Newton, Mass., and entered the Institute September, 1856. In 1859–60 was at Newton, Mass., but subsequently entered the army, where he remained until 1868, when he became a shoe manufacturer, and so continues. Was brevet-colonel U. S. Volunteers. Is a member of the Society of Arts, Boston. Married, August 9th, 1863, Mary E. Comerais. One child. P. O. address, 96 Summer street, Boston.

RUSSELL SAGE, 2d, C. E., son of Henry R. and Catharine (Smith) Sage, was born at Troy, N. Y., May 12th, 1839. Attended public and private schools at Troy, N. Y., during boyhood, Bennington Centre, Vt., Seminary 1853–55, and entered the Institute September, 1855. From May, 1859, to August, 1861, was assistant engineer Troy & Greenfield railroad and Hoosick Tunnel. From 1862 to 1868, assistant engineer Milwaukee & St. Paul railroad; assistant superintendent 1868–70; principal assistant engineer, 1871–75; division superintendent, 1874–78. Since 1878, in New York city, engaged in various financial enter-

prises, as capitalist. P. O. address, Windsor Hotel, New York city.

ARTHUR BRICE DE SAULLES, B. S., son of Louis and Armide (Lingu) de Saulles, was born in New Orleans, La., January 8th, 1840. Prepared at Bolmais, West Chester, Pa., and entered the Institute September, 1855. In 1859 entered the Imperial School of Mines, Paris, France, remaining until September, 1862. From October, 1862, until April, 1865, was an engineer in the Confederate army. April, 1866, accepted a position in the anthracite coal region, and in 1876 and since has been interested in Dunbar Furnaces, Fayette Coke and Furnace company, Puay Mining company, pig iron, coke, raw coal, &c., in Fayette county, Pa. Has built, as superintendent, two complete plants for the manufacture of pig iron. As vice president and manager, and in all cases as part owner, built three coke plants. Member of Institute of Mining Engineers, Institute of Mechanical Engineer. Married, August 19th, 1869, Catharine M. Hecksher, daughter of Charles A. Hecksher, of New York city ; six children. P. O. address, Oliphant Furnace, Fayette county, Pa.

FRANK GEST SMITH, C. E., (St. Paul, Minn.,) was born in Tioga county, Penn., February 16th, 1840. He entered the preparatory class of the Institute October, 1855. He entered the service of the Ohio and Mississippi railroad as private secretary to the president of the eastern division and general superintendent of the whole road in 1860. He held this position until the outbreak of the late rebellion, when his chief, George B. McClellan, having been appointed a major-general, and assigned to the command of the department of the Ohio, he left the road with him in the spring of 1861 as his secretary. In August, 1861, he was commissioned second lieutenant of the Fourth artillery and ordered to his battery. He served in the field through the war in the Army of the Cumberland, most of the time as battery commander, receiving the brevets of captain and major at its close. The military profession is his by adoption. He was commanding officer of the military posts at the mouth of the Columbia river (forts Stevens and Cape Disappointment). He remained in command of the post of Cape Disappointment, W. T., now called Fort Canby, until July, 1876,

when his battery was sent to San Francisco harbor, where it occupied the posts of Alcatras Island, Angel Island and the Presidio in succession until November, 1881. Between these two later dates it participated, under his command, in Crook's winter campaign against the Sioux and Cheyennes in 1876–77, in Wyoming, Nebraska and Dakota; in Howard's campaign against the Bannocks in 1878, in Nevada, Wyoming and Washington territory, and in Wilcox and McKenzie's campaign against the Apaches of Arizona in the fall of 1881. In the latter he commanded a battalion of three foot batteries. Early in November, 1881, the regiment being ordered to the Atlantic coast, he was stationed, first at Plattsburgh barracks, N. Y., and then at Madison barracks, Sackett's Harbor, N. Y. In August, 1882, he was transferred to Fort Snelling, Minn., to organize a light battery, and has been there in command of it since that time. Married, February 8th, 1866, Francis Louisa, daughter of Charles Dauchy, of Troy, N. Y. His wife died November 3d, 1878. Three children. Married, September 4th, 1881, Georgiana, daughter of Charles Dauchy. P. O. address, Fort Snelling, Minn., care adjutant general U. S. A., Washington, D. C.

Robert Imlay Sloan, C. E., son of William Henry and Caroline (Imlay) Sloan, was born in Flemington, Hunterdon county, N. J., February 23d, 1837. In 1852, when fifteen years of age, was employed as rodman with Capt. John A. Partridge, resident engineer Flemington Division of Belvidere & Delaware railroad; was engaged until 1855, having charge of one section of the road. Entered the Institute in the fall of 1855. In 1866 was assistant engineer on St. Joseph & Topeka railroad in Kansas; also on St. Joseph & Marysville railroad, Kansas. 1861–64 in quartermaster's department, army of the Potomac, in Virginia. In 1865 was surveyor of oil tracts in Venango county, Pa.; then assistant engineer on Atlantic & Great Western railroad, and on the survey of Rock river, Ill. Was city engineer of Trenton, N. J., for three years. February 1st, 1876, employed as principal assistant engineer on surveys for Metropolitan Elevated railway, New York city. February 1st, 1880, appointed engineer in charge of structure, track, and signal buildings, Manhattan Elevated railroad, New York city. July 31st, 1881, chief engineer elevated roads leased by the Manhattan company

in New York. Was interested in lumber and planing mill in connection with building houses by contract, in New Jersey, for two years. Designed foundations and track system of the Metropolitan Elevated railroad on west side, New York city, as principal assistant engineer under William F. Shunk, chief engineer. Married, June 5th, 1878; two children living. P. O, address, chief engineer Manhattan Elevated railway, 71 Broadway, New York city.

LORENZO J. DE. VIZCARRONDO, C. E., was born at St. John, Porto Rico, West Indies, March 19th, 1837. He entered the Institute in September, 1856. In February, 1861, he entered upon the work of his profession as assistant of public works in Porto Rico, first department, and acting as section chief of field work party, attending also to coast road and branches, small bridges and public buildings of fourteen villages, from St. John to Hermacao. June, 1865, he was promoted to consulting chief of scientific department, central office, and served in this capacity until February, 1867. Was then engaged in agricultural affairs, managing his farm and a large plantation belonging to his father. In October, 1872, sailed for Europe, on account of an English steam tramway scheme to be applied in Porto Rico; visited Great Britain, France and Spain, remaining for some time in Madrid, for a settlement of affairs, to accept a position on the Cordova & Malaga railroad, where he remained until 1876. Under his direction and design, there has been built in Porto Rico forty kilometers of macadamized road, bridge spanning Candelarias water course, another on Laja, and another in Fajardos district; also a number of draining culverts. Designed and commenced the church of Carolina village, the sugar manufacturing buildings of Victoria company; Fajardo city hall and district jail; Humacao's Church and Isabel Segunda's public cistern on Crab Island. Member of the Carolinas Council Board of Porto Rico; Consulting Board of Public Works; Judge of the Peace, and at present Provincial Deputy. Member Spanish Anti-Slavery Society, and corresponding member Porto Rico Country's Friends Association. Has written articles against slavery, and a report on the convenience of the designed railroad between Arecibo and St. John. He left Malaga and returned to Porto Rico in 1876, to take charge of his

father's estate. Since then he has administered a sugar cane estate, maintaining a central factory. He is at present engaged as municipal architect. P. O. address, "Arquitecto Municipal, Ponce, Island of Porto Rico.

NORMAN ALTON WILLIAMS, C. E., (Utica, N. Y.,) son of Abijah J. and and Mary (Billington) Williams, was born at Oriskany, N. Y., August 21st, 1837. Prepared at Utica Advanced School, and entered the Institute in 1856. After graduation, he was engaged for five years as assistant engineer on the Brooklyn Water Works. He then entered the engineering service of the Croton Aqueduct Department of New York city. His work in these positions was accurate and conscientious, and he deeply regretted that his health prevented him from continuing the work of his chosen profession. This, however, was the fact, and therefore, in 1864, he returned to Oneida county, becoming associated in business with his brother, in the firm of J. H. & N. A. Williams, where he remained until his death. He married, in 1866, Julia E. Millard, of Clayville, N. Y.; two children. He died October 12th, 1879. Mr. Williams was a man of modest and quiet demeanor, of marked ability, and of admirable character both in principle and conduct, and was particularly known and appreciated as such in the city of his residence. He became a member of the American Society of Civil Engineers February 17th, 1869.

CLASS OF 1860.

JAMES WILBUR BIRDSALL, T. E., was born in Troy, N. Y., December 7th, 1840. Entered the Institute in the fall of 1857. Has never followed the profession of engineering. Is a merchant in New York city, 255 Sixth avenue.

ALBERTO DE CASTRO Y BERMUDEZ, T. E., son of Vicente Antonio and Clara Josefa (Reimedez y Perez) de Castro y Bermudez, was born in Havana, Cuba, July 14th, 1839. Prepared at Penguet French School, New York, South Lambeth grammar school, London, Eng., Montpelier Lyceum, Montpelier, France; St.Louis Lyceum, Paris, France. Entered the Insti-

tute 1856. December, 1860, to June, 1861, was assistant engineer Cardenas & Jucaro railroad, Cuba. June, 1861, to January, 1864, municipal engineer, Havana. January, 1864, to February, 1867, municipal architect and director of municipal works, Havana, Cuba. Since then has been chief engineer of Havana tramways and omnibus company. Besides the above, he has held the following accessory places since their respective dates: 1876, chief engineer of the district of San Lazaro in Havana, and of the property of the hospital of that name; 1878, chief engineer of the districts of Carmelo and Vedado in Havana; 1879, chief engineer of the Medina district, Havana; 1881, consulting engineer and inspector of works of the San Cayetano & Vinales railroad, Cuba. Designed an iron bridge on the Cardenas & Jucaro railroad; stone arch bridge at Chavez, Havana; fireproof buildings for municipal workshop, Havana; Church of the Sacred Heart at Vedado, Havana; Irijoa Theatre, Havana; Manzanillo & Bayamo railroad structures; Ibañez & Carbourn Manure manufactory, railroads and buildings at La Miranda and connecting railroads; Tuelin and Trahel la Catolin parks in Havana; Almendares tannery buildings and works; most of the tramways in Havana and their stations. Made reviews of designs of the structures of the San Cayetano & Vinales railroad; designs, &c., of Almendares railroad, Cuba; of the buildings, &c., of the Havana Ice Manufacturing Co.; the Vedado, San Lazaro & Medina districts, Havana; designs for over two hundred houses in Havana, and the direction of twenty-seven others of varying importance. Received degree of surveyor and master of works from professional school of Cuba. Married July 14th, 1864, Henrietta Frances Ross, of Troy, N. Y. Six children. P. O. address, Ferro-Carril Urbano, Empredado No. 34, Havana, Cuba.

Luiz da Rocha Dias, Jr., T. E., C. E., son of Luiz da Rocha and D. Maria Constanca da Moura Requion, was born in San Salvador, Bahia, Brazil, S. A., August 26th, 1838. He entered the Institute in September, 1855. In August, 1864, he began his professional work on the D. Pedro II railroad, Brazil, remaining until November, 1872. From November, 1872, to July, 1878, directed the exploration for the extension of the Recife & S. Francisco railroad, province of Pernambuco, and that of Paca-

tuba to Baturite, province of Ceara. In 1876, contractor of the exploration for the Parauagua & Curitiba railroad, province of Parana. In June, 1878, was appointed by the government of Brazil, chief engineer of the Sobral railroad, province of Ceara, and in 1882 was appointed to the same position on the Bahia & San Francisco railroad extension, province of Bahia, which position he still holds. In 1882 he was honored by the government with the title of "Commendador da Imperial Ordem da Rosa" for his distinguished professional services. At the annual commencement of the Institute, 1882, the honorary degree of C. E., was conferred upon him. He has been elected a member of the Club de Engenharia, and the Instituto Polytechnico Brazileiro. He was married in Troy, N. Y., June 15th, 1860, to Angeline Henrietta Smith, daughter of John Smith, A. M. Six children. P. O. address, Caixa, 89, Bahia, Brazil, S. A.

RICHARD DESPARD DODGE, C. E., (Brooklyn, N. Y.) son of Richard James and Henrietta (Despard) Dodge, was born in New York City, September 6th, 1859. Prepared at French and classical school of A. Boursand, Brooklyn, N. Y., and entered the Institute September, 1857. September, 1860, was assistant engineer Hoboken Land and Improvement company's railroad to Newark; July, 1861, assistant engineer Brooklyn city & Newton railroad; April, 1862, assistant engineer Stevens' Battery, Hoboken; July, 1862, entered engineer corps United States navy; had eighteen months' sea service in West Indies and on blockade duty; two years at Naval Academy as instructor in natural and experimental philosophy; then two and a half years in the Bureau of Steam Engineering, Navy Department, Washington, designing details of marine engines. In July, 1878, he resigned and entered the railroad and city surveying business in Jersey City. March, 1877, was made superintendent of the H. W. Johns manufacturing company's asbestos roofing and boiler felting works, Brooklyn. July 1st, 1880, resigned to take charge of Dodge & Olcott's essential oil distillery in Jersey City, remaining until July 1st, 1883. September 17th, 1883, opened the Prospect Park Institute, Brooklyn, a scientific training school for boys. July 18th, 1866, married Annie W. Nourse, daughter of Prof. Joseph E. Nourse, U. S. Navy. One son. P. O. address, 58 Clark street, Brooklyn, N. Y.

EDWARD MAXWELL GRANT, C. E., son of Joseph Fellows and Caroline A. (Maxwell) Grant, was born at Dean's Corners, Saratoga county, N. Y., November 21st, 1839. Prepared at Poultney Academy, Poultney, Vt., and entered the Institute in 1857. He went to Tennessee in 1860 as civil engineer on Howe truss bridge building. In 1861 he came North and recruited a company of cavalry, and as first lieutenant of Second Mounted Rifles went to Norfolk, Va., and was detailed as captain of engineer corps. Returned South in 1865 as engineer of construction of railroad bridges. Erected all the bridges on the East Tennessee & Virginia railroad and East Tennessee & Georgia railroad, extending from Lynchburg, Va., to Dalton, Ga. As a member of the firm of Mallory, Grant & Co., Macon, Ga., in 1869, he designed and built a wrought iron bridge on the Montgomery & Selma railroad, over the Alabama river, 800 feet long, resting on wrought piers (from low water mark), which was of his own designing, and is the only structure of the kind in existence. In 1871 he located and built a narrow gauge railroad in Alabama, from Tuskegee to Chehaw, forming a junction with the Montgomery & West Point railroad. Took charge of and developed the Wilson patent for making merchant iron direct from the ore, 1874. He took the patent to England, and erected furnaces at Wigan, England; also built furnaces in Finland, two hundred miles north from St. Petersburg, Russia. After visiting the principal cities in Europe, he was appointed brigadier-general in the Bulgarian army, and acted as war correspondent for the London *Daily News* from Belgrade, Servia. At the breaking out of the Russo-Turkish war, he was appointed staff correspondent for the London *Daily Times* at Bucharest, Roumania; was with the Russian army during the campaign, and was given *carte blanche* as to expenses, and highly complimented by his paper for his efficiency. After the surrender of Plevna, he, with two other correspondents, crossed the Balkan mountains in midwinter, on horseback to Adrianople. After reporting the settlement of Bulgaria, he returned to Belgrade, where he was appointed United States vice consul general and held the office and was located there until his death, which occurred October 21st, 1884. Being a general favorite at the court of King William, he obtained concessions from the king for developing the Servian country, and was decorated by

him with the Cross of the Commandery, the highest honor within his power to confer. Monsieur Mijatovich, Servian minister to England, wrote of him that not only the king and his ministers mourned him as a genial friend, but as a great loss to the country of Servia. He had just completed the sale of a large coal interest to a Scotch syndicate when his death occurred, caused by inflammation of the brain.

HENRIQUE HARRIS, T. E., C. E., was born in Maracaibo, State of Zulia, Venezuela, S. A., in 1839. Entered the Institute September, 1856. Entered upon the work of his profession about 1867; was in the department of city works, Brooklyn, as assistant engineer, for four years; was chief engineer of sewerage department, New Brunswick, N. J., for two years; chief engineer of the Long Island railroad until his death, which occurred suddenly, October 10th, 1882, in the city of Brooklyn. Was a member of the American Society of Civil Engineers.

GEORGE CLEMENT HOLTON, C. E., son of Ezra William and Lucy (Clement) Holton, was born at Belleville, county of Hastings, Ontario, July 28th, 1842. Prepared at the grammar school at Belleville, and entered the Institute in 1856. Spent some time at Bryant & Stratton's Commercial College, Buffalo; several years in business afterwards; appointed commissioner of inland revenue in 1870. Died November 6th, 1878. Married, November 23, 1870, Augusta Ann Ross, daughter of James Ross. Four children.

RAMON MATAS, T. E., was born March 20th, 1839, in Barcelona, Spain. Entered the Institute preparatory class in 1856. After graduation, returned to Spain, and entered upon his profession as civil engineer.

CHARLES MCMILLAN, C. E. *See Professors, page 153.*

CALVIN PARDEE, B. S., son of Ario and Elizabeth (Jacobs) Pardee, was born in Hazleton, Luzerne county, Penn., July 17th, 1841. Prepared at Rev. Samuel Miller's West Jersey Collegiate Institute, Mount Holly, N. J., and entered the Institute in 1857. Entered upon the work of his profession in 1862, as superintendent of coal mines for A. Pardee & Co., Hazleton, Penn., which position he held until January, 1st, 1884. Has also been a coal

operator (and is still one,) at Lattimer, Hollywood and Mount Pleasant mines, near Hazleton, Penn. Entered the United States army as a volunteer in the First Regiment Pennsylvania Volunteers, in April, 1861 ; this regiment was mustered out in July, 1861. Afterwards entered the army as second lieutenant company N, Twenty eighth regiment Pennsylvania Volunteers ; served in this capacity, and as first lieutenant, until October, 1862, when he resigned on surgeon's certificate, being disabled. Married, June 4th, 1867, Mary Byrne. Nine children, eight living. P. O. address, Hazleton, Pa.

JOHN PEMBERTON, JR., C. E., was born in Albany, N. Y., June 6th, 1836. Entered the Institute in 1858. After graduation was assistant engineer on the Croton Water Works. In 1863, entered the United States navy, and was third assistant engineer on the steamer Canandaigua. In 1864, was second assistant engineer on same steamer. In 1865, held same rank and was assistant professor of natural and experimental philosophy in the U. S. Naval Academy at Newport, R. I., and afterward at Annapolis, Md. In 1874, as passed assistant engineer, was on the steamer Plymouth, and still later, stationed at Philadelphia, Pa.

WILLIAM HENRY SEARLES, C. E. *See Professors, page 152.*

AURELIUS SERRANO, C. E., was born in Maracaibo, Venezuela, S. A., June 16th, 1835. After graduation from the Institute, he returned home, where he remained for about one year ; was assistant engineer on the public works of Havana, Cuba, and was afterward employed as assistant engineer on the Croton water works, New York city. The date of his death has not been ascertained. It was while on a visit at Mr. Serrano's, that Prof. Elderhorst died with yellow fever, July 28th, 1861.

WILLIAM STEPHENSON SIMPSON, B. S., (Baltimore, Md.,) son of T. W. and Mary C. Simpson, was born at Charlestown, Jefferson county, Va., October 9th, 1839. Prepared by the Rev. Dr. P. O. Studiford, Lambertville, N. Y., and entered the Institute September, 1856. From September, 1860, to January, 1861, was on the United States Coast Survey ; construction of Washington, D. C., aqueduct until April, 1861 ; served in the Confederate army until May, 1865 ; was on the Baltimore & Ohio railroad

until August, 1869; Chilicothe, Council Bluffs & Omaha railroad to May, 1870; and to October, same year, on St. Louis & South Eastern railroad. Since that time assistant engineer. Engineer Department United States Army; first at Mobile, Ala., on improvement of Mobile harbor, then on Osage river, Mo., and on the improvement of the Mississippi river between the Illinois and Ohio rivers. P. O. address, United States Engineer's Office, Custom House, St. Louis, Mo.

CHARLES EDWARD SMITH, C. E., LL. B. *See Instructors, page 171.*

FELIX RANDOLPH ROBERTSON SMITH, C. E., son of Thomas and Elizabeth (Robertson) Smith, was born in Nashville, Davidson county, Tenn., March 16th, 1838. Attended the Western Military Institute, Nashville, Tenn., and prepared for West Point, but failed in obtaining appointment. He entered the Institute in September, 1857. Some months after graduating the civil war commenced. He was appointed lieutenant of engineers for Tennessee. Was afterward appointed by the Confederate states a captain of engineers, and as such served during the war. Was a prisoner of war at Johnson's Island, Lake Erie, when the war closed. After the war he was located, as civil engineer and surveyor, at Nashville, Tenn. The city grades &c., were all established at this time, and street cars first introduced. His father's health failing, he was compelled, in 1868, to take charge of his plantation in Arkansas, and is still located there. His services are frequently in demand making estimates for and locating river levees. Was several times elected justice of the peace. Married, November 28th, 1866, Cynthia E. Rodes, daughter of Robert Rodes, of Giles county, Tenn. Five children. He has prepared several young men for West Point. P. O. address, Heckatoo, Lincoln county, Ark.

CHARLES BUCCLEUGH THOMPSON, B. S., (Houston, Ga.,) son of Norman B. and Seraph H. (Ruggles) Thompson, was born in Americus, Sumter county, Ga., February 26th, 1839. Published several small works, stories, and did some newspaper work. Died in 1869, in New York city. During the civil war he served as lieutenant in the Confederate Navy. After the war, resided

several years in Rockford, Ill. The Macon (Ga.) *Journal and Messenger*, of March 16th, 1869, published the following :

" There died in the city of New York, on the 11th day of January, 1869, one of the most remarkable men of his age that Georgia ever produced. In the year 1839, in the town of Americus, in this State, was born of highly respectable parents the subject of this memoir. A short time after his birth, his parents removed to Perry, Ga., where he spent the years of his boyhood, and received the rudiments of his fine education. At an early age, he gave evidence of that ambition for adventure which took him, at the age of fifteen, on board a vessel bound for the Pacific Ocean, whence he passed into the tropical seas, where he remained for a number of years, and where he indulged his daring spirit in desperate encounters with the junks of the formidable Chinese pirates. Upon his return to his native land, he was sent to the Rensselaer Polytechnic Institute at Troy, N. Y., to complete his education, and where he graduated with distinction. As he had just left school at the beginning of the war, he came South and offered his services to the Confederate government. He was made an officer in the Confederate navy, and put on board the steamer Resolute, at Savannah, where his accomplishments soon proved him one of the most efficient officers in our service. After the war he removed to New York city, where he was at first engaged as a civil engineer, but soon became connected as a contributor in the literary department of the New York *Post*, where he became eminently distinguished for the versatility and brilliancy of his genius. It was while thus employed that he wrote the " Nautch Girl," a romance of the Indian Ocean, which his death has prevented being completed, but which is now in the press of the Harpers. It is highly spoken of by the northern press, and will be read with interest by all who have read the thrilling adventures of the author, as published in *Frank Leslie's* and the *Home Journal*."

JOHN DASH VAN BUREN, JR., C. E. *See Trustees, page 111.*

CLASS OF 1861.

WILLIAM LEVERETT BALDWIN, C. E., M. D., son of Abel Seymour and Eliza (Scott) Baldwin, was born in Jacksonville, Duval county, Florida, March 18th, 1840. Prepared at the Walnut Hill school, Rev. Thomas Crosswell Reed, D. D., and entered the Institute September, 28th, 1858, graduating July 11th, 1861. December 23d, 1863, he graduated at the Albany Medical College, Albany, N. Y., as M. D., and has followed the profession of medicine and surgery since. Was supervisor of the Tenth Ward, Utica, N. Y., 1870–71; in charge Utica City Hospital, 1869–70; health officer of Utica, N. Y., 1868–69; health officer of Geneva, N. Y., 1864–65; commissioner of charities, city of Utica, 1871–74; member of County Board of Health of Duval county, Florida, 1883; member of the Oneida County Medical Society, Oneida county, N. Y.; permanent member of the State Medical Society of New York; member of the Duval County Medical Society, Duval county, Fla.; Member of the State Medical Society of Florida. He has contributed to medical periodicals. Married, September 12th, 1866, Cornelia Coventry, daughter of C. B. Coventry, M. D., of Utica, N. Y. Three children. P. O. address, Jacksonville, Duval county, Fla.

ALFRED PANCOAST BOLLER, A. M. C. E., son of Henry John and Anna Margaretta (Pantoast) Boller, was born in Philadelphi, Penn., February 23d, 1840. Prepared at the University of Pennsylvania, and graduated in June, 1858, as A. B. He entered the Institute September, 1858, in division C, and graduated in June, 1861. In the fall of 1861 he was appointed rodman for the Nesquehoning Valley railroad, Pennsylvania, and was promoted to the instruments and charge of party in due course of time. Made surveys and topographical map of southern and middle coal fields (anthracite), with their outlets to market, during the spring of 1862, for the Lehigh C. & N. Co. In June of the same year he was appointed assistant engineer on middle division Lehigh canal (lower navigation) on repairs of damages after the great freshet which almost destroyed that canal. May, 1863, was appointed assistant engineer to general manager, J. D. Potts, Pittsburgh & Erie division, Pennsylvania rail-

road, and specially charged with the supervision of bridges and structural work. Was commissioned by general manager to visit the cities on the Great Lakes and report upon harbor improvements and terminal facilities, with a view to such improvement at Erie, Penn. Resigned from Pittsburgh & Erie railroad in the summer of 1865 to take charge, as civil engineer, of the building of a highway suspension bridge at Williamsport, Penn., which was finished by the end of the same year. In the spring of 1866 accepted a position as engineer of bridges Atlantic & Great Western railroad, and removed to New York. The road shortly after failed. Opened an office at Newark, N. J., and after three months accepted position as engineer on the Hudson River railroad; during the six months he was connected with that road, he planned the St. John's Park depot. In the spring of 1867, joined O. Mulliken, Jr., forming firm of Mulliken & Boller, representing the Phœnix Iron Co. in New York, and doing a general commission business. During the four years of that partnership, did more or less engineering work, principally the Bridgeport bridge and freight sheds of the Empire Transportation company; piers 38 and 39 North river, New York. In the summer of 1871, he accepted the position of vice-president and engineer of the Phillipsburg manufacturing company, N. J. In the fall of 1874 he opened an office at 71 Broadway, as contracting and consulting engineer, where he is still located. Since 1868, his home has been in East Orange, N. J. Since 1874 has occupied professional positions as follows: chief engineer Yonkers Rapid Transit commission; chief engineer West Side & Yonkers railroad; chief engineer Manhattan Elevated railroad company; chief engineer Albany & Greenbush bridge company; chief engineer New York, Philadelphia & Baltimore railroad; consulting engineer Department of Public Parks; consulting engineer Rapid Transit commission of 1884, New York; consulting engineer to the contractors for building the foundation of the Bartholdi pedestal. Served as engineer and contractor on the Albany & Greenbush bridge, West Side & Yonkers railroad, including Eighth Avenue bridge over the Harlem river, New York; Broux river bridges between New York and West Chester; superstructure Madison Avenue bridge, New York, over Harlem river; Croton Lake bridge, and all superstructure work, N. Y., C. & N. railroad; Congress street

bridge, Troy, N. Y.; Central avenue bridge, Newark, N. J.; Eastern avenue draw, Boston, Mass., and various bridges on different railroads and highways; Port Jervis suspension bridge, engine house and terminals W. S. & Y. railroad; and numerous locomotive turn-tables. Was contractor on Bergen county (Erie) railroad, (firm Boller & Diche); extension Pittsburgh & Lake Erie railroad, (firm name Jones, Drake & Co.) Member of American Society of Civil Engineers, American Institute of Mining Engineers, University Club, New York. Has contributed to Franklin Institute Journal, Railroad Gazette, and published "Iron Highway Bridges." Addressed graduating class of the Institute, 1874. Married, April 28th, 1864, Katharine Newbold, daughter of W. H. Newbold, of Philadelphia. Five children. P. O. address, office, 71 Broadway, New York; residence, Brick Church, Essex county, N. J.

EBENEZER PUTNAM BUCKINGHAM, C. E., son of C. Putnam and Mary P. (Turner) Buckingham, was born in Mount Vernon, Knox county, Ohio. He prepared at Kenyon College, Gambier, Ohio, and entered the Institute in 1858. Immediately after graduating he took charge of the Kokosing iron works in Mount Vernon, Ohio, and afterwards was appointed aide-de-camp to the Governor of Ohio. The next year he went to New York, and assisted in building a sugar refinery; in 1865 went to Ohio, and commenced boring for oil in Knox county. In the the fall of 1865 he went to Florida, and engaged in the lumber business until October, 1866, when he died of typhoid fever.

JAMES CROMWELL, C. E., was born at Cornwall, N. Y., January 4th, 1840. He was of Quaker parentage, and remained himself a member of that society until he joined the army. Some men are not made of common clay; and whatever may be their rank in a social point of view, God writes *noble men* on their brows, and all men pay involuntary respect. This was especially true of James Cromwell.

He entered the Institute in May, 1858, and graduated June 3d, 1861, in advance of his class, in order to enter the service of the country he loved so dearly, that glorious cause for which he ultimately sacrificed his life. We, who knew and loved him, are able to contemplate his student life with unalloyed satisfaction. Not only did he stand high in the prescribed studies of the

Institute course, but those same qualities which won him respect and esteem amid the noise and bloodshed of war, made him first in the affection of his fellows in the peaceful pursuits of science. He was elected to the most popular office among the students, which he retained as long as he remained in Troy. Better than all, his character stands out prominent in its moral purity, unstained by any of those youthful excesses which are too often the accompaniments of college life. He was a gentleman in the truest, noblest acceptation of the word.

The firing on Fort Sumter aroused in James Cromwell all the indignation natural to a heart so full of truthfulness and patriotism. He would, by entering the army, oppose the teachings of that religion under whose influence he had been educated. Nothing bade him go but the call of duty; to him that call was more than all else. "Bid me stay," he told his friends, "and there is an end of the matter, but remember, that while I obey you I will be neglecting a solemn call from God and my country, a course which would sadly affect all my after life." One answer could come to such an appeal, and one only: "Go, and God bless you." He did go, and of all our noble martyrs that have been called from "works to rewards," none went with more Christian purpose or with braver heart than James Cromwell.

He was engaged in various skirmishes, among others at Manassas Gap, November 6th, 1862, and in the more important conflicts at Fredericksburg, Va., December 14th and 15th; at Chancellorsville, Va., May 2d, 3d and 4th, 1863; at Beverly Ford, Va., June 9th, 1863, and at the decisive battle of Gettysburg, July 2d, 1863, in which he lost his life, at the early age of twenty-three. Throughout his career as a soldier his courage was conspicuous even in that army of brave men who purchased peace for us at such a costly price. James Cromwell seemed fully to illustrate in his brief life the familiar lines—

> "Where duty calls or danger
> Be never wanting there."

Thus responding to the call of duty, and liberty among the first, he was true to their promptings to the last; and at the age of twenty-three he had attained a position commanding respect of all. How grandly his tall figure looms up amid the blood and smoke of battle! Patiently and heroically he had borne the heat and burden of the fight with his men—stubbornly they

had held their ground amid iron storm, till the enemy wavered and were giving way—then riding forward, he turned to his men with a glad smile, and called to them to advance, shouting Victory! At that moment the fatal shot struck him, but "he came a conqueror to his rest." Though he then departed, the glad smile still remained upon his features—victory remained; and his noble memory remains, and will ever be one of the most cherished traditions of his alma mater. In our memories he will ever be enshrined, as he last stood on that great decisive battle field of the century—a smile upon his face, his sword waving high, and shouting *Victory!* He was married to Anna Barton, daughter of Richard Barton, of Troy, N. Y.; one daughter.

RUFUS H. EMERSON, C. E., (South Reading, Mass.,) was born in Boston, Mass., July 14th, 1840. Entered the Institute in the fall of 1868. He has been a merchant and coal operator in Erie, Penn. Also engaged for some time in the refining of sludge acid, and at present in the lumber business and manufacture of wood pulp. Married Anna M. Starbuck, (deceased,) daughter of Nathaniel Starbuck, of Troy, N. Y.; three children. P. O. address, Jackson, Mich.

WILLIAM FENTON, C. E. *See Assistant Professors, page 163.*

JOSEPH G. FOX, C. E., A. M. *See Instructors, page 168.*

ESTEVAN ANTONIO FUERTES, C. E., son of Estevan and Demetria (Charbonnier) Fuertes, was born in St. Johns, Porto Rico, W. I., May 10th, 1838. Prepared at Conciliar Seminary of San Yldefonso. Received several degrees, diplomas, etc. Entered the Institute in September, 1857. July, 1861, director public works, etc., Porto Rico; June, 1863, examining engineer Croton aqueduct, New York city; August, 1871, chief engineer Tehuantepec ship canal expedition; August, 1873, professor of civil engineering and Dean of the faculty of engineering at Cornell University; consulting engineer since June, 1864, in addition to the places mentioned above, and in which he has been engaged continuously, resigning one position to take the next; has built many miles of road, wood, iron and stone bridges, arches and oblique arches, light houses, canals for irrigation and internal

communication, water works, sewers, river and land improvements, etc.; was director of public works, western district, island of Porto Rico; is a member of the Royal Economic Society, American Society of Civil Engineers, American Institute, Humbolt Society, Society of Geography and Statistics, etc. He has written several pamphlets. Married, December 21st, 1860, Mary Perry, daughter of Amos S. Perry, Esq., of Troy, N. Y.; five children. P. O. address, Ithaca, N. Y.

BURDETT CHASE GOWING, C. E., son of George W. and Ursula (Chase) Gowing, was born at Tully, Onondaga county, N. Y., February 27th, 1838. Attended district school at Tully, and Cortland Academy, Homer, N. Y. Entered the Institute in February, 1858. September 21st, 1861, he was appointed third assistant engineer in the United States navy; chief engineer United States navy August, 1886. Married, August 15th, 1864, Julia Adelaide Williamson, of Troy. N. Y.; one child. P. O. address, No. 576 Herkimer street, Brooklyn, N. Y.

WILLIAM LAWRENCE HASKIN, C. E., (Baton Rouge, La.), son of Joseph Abel and Rebecca E. (Sprague) Haskin, was born in Houlton, Arostook county, Maine, May 31st, 1841. Entered the Institute, Division D, in 1857. Was appointed second lieutenant in the First regiment of artillery, United States army, August 5th, 1861, the year in which he graduated; promoted to first lieutenant, to date also from August 5th, 1861; served in Fort Pickens, Fla., during the siege by the Confederates in 1861–2, then in Louisiana; took an active part in the battle of Fort Bisland, La., April 12 and 13, 1863, as lieutenant of Light Battery F, First artillery; commanded detached section (two pieces) in a skirmish April 14, 1863; present throughout the siege of Port Hudson, La., from May 27th to July 9th, 1863; in command of a battery of mortars during the last two weeks of the siege; commanded Horse Battery F, First artillery, in the action of Marksville, La., May 15th, 1864, and the battle of Mansura, Ka., May 16, 1864; received the brevet of captain, to date July 8, 1863, for services at Port Hudson, and the brevet of major, to date March 13, 1865, for services during the war; when the war closed was stationed at Fort Trumbull, Conn., and then consecutively at Fort Schuyler, New York harbor, Fort Hamilton, New York harbor, Charleston, S. C., Fort Preble,

Me., Fort Point, Cal., and the Presidio of San Francisco, which is his present station; became a captain in the First Artillery July 28th, 1866, and commanded Battery H, First artillery, from promotion until January 1st, 1884, when he was transferred to Light Battery K, First artillery, which he now commands. In 1876, while stationed at Fort Preble, Me., he was ordered with his battery to South Carolina, and then to Florida, on duty connected with the disputed Presidential election; in 1877 was sent to Pennsylvania, on account of the labor riots; published "History of the First Regiment of Artillery, in 1879, at Portland, Me. Married, April 26th, 1865, Annie Lydia Davis, daughter of William Davis. Five children; four living. P. O. address, Presidio, San Francisco, Cal.

WARREN TODD KELLOGG, C. E., (Lansingburgh, N. Y.), son of Charles H. and Frances A. (Parmelee) Kellogg, was born in Troy, Rensselaer county, N. Y., December 1st, 1841. Prepared at the Troy Academy, and entered the Institute in September, 1857. For six months, in 1863, he was assistant engineer in the office of the New York Central railroad, located at Albany, N. Y.; manufacturer of machinery, in Troy, till 1877, and in Cohoes, N. Y., since then. Married November 22d, 1865, Alice M. Eddy, daughter of Titus Eddy. Four children; two living. Has held the office of vice president of the alumni association of the Institute, and also of corresponding secretary for several years. P. O. address, Lansingburgh, N. Y., or Cohoes, N. Y.

JAMES LALLY, C. E., (Lansingburgh, N. Y.) was born in Norwalk, Fairfield county, Conn., December 11th, 1841. Prepared at the Troy Training School, and entered the Institute in the fall of 1857. He engaged in the coffee jobbing business under the firm name of Dymond & Lally, at New York and New Orleans, and later became a member of the firm of Barr, Lally & Co., at 113 Water street, New York. He became an annual member of the New England Society in New York in 1868, and was made a life member in 1876. He died July 15th, 1878, at Riverdale, on the Hudson, N. Y.

ANTHONY TEN EYCK MULLIN, C. E., son of Joseph and Lydia M. (Ten Eyck) Mullin, was born in Watertown, Jefferson county, N. Y., January 21st, 1841. He studied in the city schools and

in the preparatory school at Sing Sing, N. Y., entering the Institute in the fall of 1857. His graduation was at a time when the country was just entering upon the first excitements of a civil war. His patriotism was outspoken and he made known at once his desire to serve his country. He entered the navy as third assistant engineer in August, 1861, and was immediately ordered to the Harriet Lane, at the Philadelphia navy yard. He went with his ship to the Gulf of Mexico, and was present and participated in the attack on the forts below New Orleans, and subsequently in the capture of the city by Admiral Farragut. From New Orleans he went with his vessel to Galveston, Texas, where one of the fiercest naval battles of the rebellion was fought, and where he displayed a bravery which won for him the admiration of his superiors as well as his countrymen who remember that savage conflict. After a sharp and hard contested fight, the Harriet Lane was captured by the Confederates. The captain and first lieutenant of the Lane were killed, and nearly every officer of the ship disabled, except Mr. Mullin and one other officer. In this conflict Mr. Mullin fired the last gun before being overwhelmed by the enemy. He was then taken prisoner and confined at Galveston and Houston for several months. With several other naval officers he was finally paroled, and they walked, or rode on horseback across the country from Houston to New Orleans.

Mr. Mullin then visited his home, and after spending a few weeks there was ordered to the Agawam, which was stationed on the James river on the Atlantic coast. At the time of Gen. Butler's attack on Fort Fisher, the idea was conceived by some of the officers of the government, that preliminary to the attack on the fort by the soldiers and marines, an explosion of a large quantity of gunpowder near Fort Fisher might either destroy the fort, or dismantle its guns, or cripple its power in other ways. It was finally determined to procure an old steamer, load her with gunpowder, with fuses and appliances for discharging it, run her ashore at night as near the fort as possible, and then blow her up. This expedition was given in charge of Lieutenant Commander (now commodore) Rhind, and he selected as officers under him Mr. Mullin and Lieutenant Porter.

These officers joined the powder ship, after she had been loaded with over two hundred and fifty tons of gunpowder, at

some point below Fort Fisher. They steamed up to the fleet and remained on this boat two or three days. Finally, on one dark night, the vessel was put under steam with a steam launch in tow. They ran the vessel aground near the fort, so near that they could hear the voices of the sentinels on guard. They tried their fuses, and much to their chagrin and disappointment, found them out of order. Consultation was held and it was finally agreed to set fire to the ship, and make their escape with the steam launch which was in tow. This was done, the ship was blown up as expected, with results which are remembered. For this act all of the officers were promoted. Captain Rhind is still living, but Lieutenant Porter was killed a few days afterward while leading a charge of marines and sailors in the attack on Fort Fisher. The following letter, written shortly afterward, speaks for itself:

U. S. STR. AGAWAM,
NAVY YARD, NORFOLK, Jan. 3, 1865.

HON. GIDEON WELLES, Sec'y of the Navy—*Sir:* Second Ass't Engineer A. T. E. Mullin, recently ordered to examination in Philadelphia "in recognition of his gallant services while attached to the Louisiana," has served with me in this vessel for about a year. I desire to express to the Department my appreciation of the services and qualifications of this officer. His attention to duty, zeal and capacity, are of the highest order. He has been always ready to volunteer on any service, however hazardous, and on the occasion of selecting the officers to accompany me in the Louisiana, Mr. Mullin immediately assented when I proposed to him that duty. As his length of service would entitle him in a very brief period to an examination as a first assistant engineer, I trust the department will see fit to advance him to a still higher grade "in recognition of his gallant services while attached to the Louisiana. Very respectfully, your obedient servant, A. C. RHIND, Commander.

At the close of the war, upon being relieved from the Agawam, Mr. Mullin went on the Hartford, on a three years' cruise to China and Japan. Returning from the East, he subsequently took another three years' cruise, this time upon the Plymouth, to European stations. During this cruise his ship was escort ship to the English iron-clad that brought the remains of Peabody to this country, and he was complimented by an invitation to attend the grand review at the return of the German troops at the close of the Franco-Prussian war. Upon his return he was stationed at New Orleans on special duty, and was then ordered to join the Richmond, his last ship, on a cruise to the South Pacific. About two years were spent by the Richmond in cruis-

ing on the western and eastern coasts of South America. Mr. Mullin came home with his ship, and reached Boston about two weeks before his return to Watertown. He was left in charge of his department for a few days after reaching port, only arriving home on the morning train, on Tuesday, September 20th, 1877, his death occurring the evening of that day.

He was apparently in his usual health, nor had the family any knowledge that he was not. He had made no complaint, and spent the day in calling upon friends about the city. After tea, while seated with the family in the sitting room of his father's residence, and relating incidents of his last cruise, about 8 o'clock, suddenly and without a sign or any apparent pain or suffering, he fell back in his chair and ceased to breathe. The shock to his family can better be imagined than described. While enjoying a long broken family re-union, and in the midst of the enjoyment of relating to interested friends the memories of a two years' absence, death came without warning and did his silent work.

ROBERT NEILSON, C. E., son of Thomas and Eliza (Downey) Neilson, was born in Fredericksburgh, Lennox county, Ontario, Canada, August 19th, 1837. Prepared in the common schools of Canada, and entered the Institute in September, 1858. Entered upon the work of his profession with the Pennsylvania railroad company in October, 1863, and has been in their service since that date, and is at present general superintendent Philadelphia and Erie division of the Pennsylvania railroad and Northern Central railroad. Is a member of the American Society of Civil Engineers. Married, June 26th, 1866, Elizabeth J. Wright, daughter of Solomon Wright. Six children; five living. P. O. address, Williamsport, Penn.

THOMAS GUILFORD SMITH, A. M., C. E., son of Pemberton and Margaretta E. (Zell) Smith, was born in Philadelphia, Philadelphia county, Penn., August 27th, 1839. Prepared at the Central High School, Philadelphia, graduated as A. B., and entered the Institute in September, 1858. August, 1861, rodman on the Mahanoy and Broad Mountain railroad, (now included in the Philadelphia and Reading railroad system, in Schuylkill county, Penn.; remained in the service of this company until November, 1865, resigning as resident engineer;

manager of Philadelphia sugar refinery, 1865–69; 1873, secretary Union iron company, Buffalo, N. Y.; 1878, western sales agent Philadelphia and Reading coal and iron company; 1883, of Albright & Smith, sales agents Philadelphia and Reading coal and iron company; was one of the civil service board of examiners for municipal appointments in the city of Buffalo, N. Y.; received the honorary degree of A. M. from the Central High School of Philadelphia; member of the Academy of Natural Sciences of Philadelphia, Historical Society of Pennsylvania, American Society of Civil Engineers and American Institute of Mining Engineers; published various engineering reports. Married, July 14th, 1864, at Grand Rapids, Mich., Mary Stewart Ives, daughter of Chauncey P. Ives of Lansingburgh, N. Y. Two sons. P. O. address, Buffalo, N. Y.

THADDEUS SANFORD SMITH, C. E., (St. Louis, Mo.), son of Sol and Elizabeth (Pugsley) Smith, was born at Mobile, Ala., May 31st, 1840. Prepared at the Central High School, St. Louis, Mo., and entered the Institute in October, 1858. Commenced practice of his profession in St. Louis, Mo., 1861 to 1872, from which date he was engaged in banking, manufacturing and mercantile pursuits, until 1882, when he established a brick manufactory in St. Louis, Mo., known as the Broadway brick works, in which business he is still engaged. Most of his time as an engineer has been devoted to the public works of the city of St. Louis, Mo., more especially the water works. During the late war he was an assistant engineer in the United States navy, from which he resigned on account of disagreement with health. During the last two years of the war he commanded a company in the Thirtieth (cavalry) regiment of Missouri volunteers. He is a member of the American Society of Civil Engineers, and the St. Louis Society of Civil Engineers. Married, August 26, 1872, Miss Rosalie T. Balmer, of St. Louis, Mo., daughter of Charles Balmer, Esq., an eminent musician and music publisher. P. O. address, 821 Chauteau avenue, St. Louis, Mo.

MOSHER A. SUTHERLAND, C. E., (Waterloo, N. Y.), son of Allen M. and Hannah (Beers) Sutherland, was born in Junius, Seneca county, N. Y., October 17th, 1836. He was brought up on a farm, and prepared at country schools, attending Ovid Seminary, Seneca county, N. Y., the winter of 1856, and Char-

lottesville Seminary, Schoharie county, N. Y., winter of 1857. Entered the United States navy in March, 1863, and resigned in September, 1867; was in several engagements around Charleston, on gunboat Marblehead; January, 1864, at the New York navy yard, on boiler experiments, for about six months; then ordered to the steam frigate Colorado, and was in all the battles at Fort Fisher; after it was taken, came to New York, and fitted out for the flag-ship of the European squadron, in July, 1865; after visiting the principal cities of Europe, returned in 1867; was engaged for several years in the manufacture of plumbers' goods; was city surveyor of Passaic, N. J., for several years; was employed by the Staten Island water supply company for about a year, rebuilding their works; at present is engaged in getting some of his own patents before the public. Is a member of the American Institute of New York. P. O. address, 32 Liberty street, Room 11, New York city.

WILLIAM NEWTON SYMINGTON, C. E., (Pittsburgh, Penn.), son of John and Elizabeth McCarr (Johnston) Symington, was born in Washington, D. C., June 10th, 1841. Prepared at Lafayette College, Easton, Penn., and entered the Institute in September, 1858. In January, 1865, entered the service of the Confederate States on engineer duty, and as assistant inspector of mines for Virginia and North Carolina till close of the war; March to September, 1866, assistant superintendent Bellevue zinc works, Mineral Point, Wis.; July, 1869, superintendent mines and works of American Barytes company, Alexandria, Va.; until April, 1870, superintendent Colorado silver mining company, of Baltimore, at Greytown, Col.; until February, 1873, civil and mining engineer, with office at St. Louis, Mo., engaged in the field and in consultation at various points in Missouri, Illinois and elsewhere on the Missouri river; since that time, with office in New York, engaged as consulting mining engineer and metallurgist. After graduating at the Institute in 1861, was at the University of Göttingen, and later at the Royal Saxon Mining Academy, Freiberg, until September, 1863; special student, and visiting mines and smelting works in France, Belgium and England, until February, 1864; taken prisoner by the United States blockading squadron off Wilmington, N. C., May, 1864, and exchanged January, 1865. Is a member of the American Institute

of Mining Engineers and American Society of Civil Engineers. Married, February 1st, 1883, Florence de Treville, daughter of Richard de Treville, of South Carolina. P. O. address, 18 Broadway, New York city.

CLASS OF 1862.

WILLIAM LAWSON ADAMS, JR., C. E. *See Directors, page 130.*

WILLIAM STUART AUCHINCLOSS, C. E., (New York City,) son of John and Elizabeth (Buck) Auchincloss, was born in New York City March 19th, 1842. Prepared at M. N. Lyons' Institute, New York, and entered the Institute in the fall of 1859. From 1863 to 1867 with the Jersey City Locomotive Works, Jersey City, N. J. In 1867, Paris Exposition Universelle, Paris, France. From 1869 to 1878 with the Delaware Car and Ship Building Works, Wilmington, Del. From 1879 to the present time, agency of the Middle States for J. & P. Coats, of Paisley, Scotland; offices, Philadelphia and Baltimore. Patented the following: part closers for vessels of war and casemates; axle box cover for railroad cars; indicator for elevators of buildings; narrow gauge car trucks; tremail machine for wooden vessels (produces from 2,000 to 3,000 tremails per day); averaging machines (averages 140 accounts per hour), and two improvements on same; model order book; spooler frame. He designed and built locomotives, railway cars and plant of all kinds, steam engines, boilers, machine tools, car shops, steamers, sailing vessels, steamboats, gold machinery, car wheel machinery, &c. Honorary commissioner of the United States at Paris Exposition Universelle, 1867; member of American Society of Civil Engineers, New York; Academy of Natural Sciences, Philadelphia, Penn.; Instituto Polytechnio Brazileiro, Rio de Janerio, Brazil; American Society of Mechanical Engineers, New York; American Association for Advancement of Science, Boston, Mass; Engineers' Club, Philadelphia, Penn. Published, 1869, "Link Valve Motions," seventh edition, D. Van Nostrand, N. Y.; 1874, "Ninety Days in the Tropics," Wilmington, Del.; 1867, "Steam Engineering," Paris Exposition U. S. printer; 1875, pamphlet on "Trade with South America," Wil-

mington, Del. He designed and built the first narrow gauge cars used in America. Built narrow gauge palace cars for the king of Sweden and for the emperor of Brazil. On May 11th, 1876, his majesty, Don Pedro d'Alcantara, emperor of Brazil, accepted his invitation to visit Wilmington, Del., and dined at his residence, spending the day. Married, May 3d, 1871, Martha T. Kent, daughter of William C. Kent, of Phitadelphia, Penn. Three children. P. O. address, 209 Church street, Philadelphia, Penn.

NATHAN WHITE BUCKHOUT, C. E., son of Abraham and M. A. (White) Buckhout, was born at Oswego, Oswego county, N. Y., May 16th, 1842. Prepared at Oswego High School, and entered the Institute in the fall of 1860, graduating in 1862. He entered the navy as second engineer on the iron clad monitor Nantucket in the fall of 1862, and was afterward on the steamship Wabash. At the close of the war he returned home, and in the winter of 1865 was employed by an oil company in New York to survey oil tracts in and around Burksville, Ky. He died of typhoid fever June 26th, 1866.

RICHARD HOOKER BUEL, C. E., son of Samuel and Jane Eliza (Wilmer) Buel was born in Cumberland, Alleghany county, Md., November 9th, 1842. Prepared at Poughkeepsie Academy, and College of St. James, Hagerstown, Md. He entered the Institute in the fall of 1859. Began the practice of his profession as engineer officer in the United States navy from September, 1862, to September, 1867. Engaged in the lumber business in North Carolina from September, 1867, to March, 1870. Assistant engineer of Tehauntepec and Nicaraugua surveying expedition from October, 1870, to June, 1871. Practicing as mechanical expert in New York since July, 1872. Member of American Society of Civil Engineers. Wrote "The Cadet Engineer," Philadelpha, 1865; "Safety Valves," New York, 1875; additions to DuBois' translation of Weisbach's "Heat, Steam and Steam Engines," New York, 1878; articles on boilers, steam, steam engines, air engines, fire engines, pumping engines, and injectors in "Appleton's Cyclopædia of Applied Mechanics," New York, 1880; additions to "Mallett's Compound Engines," New York, 1884. P. O. address, 206 Broadway, New York.

HORACE CROSBY, C. E., son of William Chase and Mary (Wilson) Crosby, was born at Atkinson, Piscatauqua county, Maine, June 6th, 1838. He prepared for the Institute in the schools of Atkinson and Bangor, Maine, and entered the Institute in 1859. After graduation he was engineer in charge of the United States government fortifications at Eastport, Me.; assistant engineer on the Brooklyn water works; civil engineer at New Rochelle, Westchester county, N. Y., which is his present address.

ARBA READ HADDOCK, C. E., son of Charles C. and Hannah C. (Read) Haddock, was born in Buffalo, N. Y., March 19th, 1842. Prepared at Training School, Troy, N. Y., and entered the Institute in 1858. At the Delemater Iron Works, New York, October, 1862; New York Produce Exchange; Haddock & Langdon, brewers and malsters. Member of the American Society of Engineers, New York. Married, October 16th, 1877, K. L. Van Wyck, daughter of Richard Van Wyck. Two children. He died suddenly of pneumonia February 28th, 1885.

ANICETO GARCIA MENOCAL, C. E., son of Gabriel Garcia and Carmen (Martin Monte Rey) Menocal was born in Havana, Cuba, September 1st, 1836, and in this city received his preparatory education. Entered the Institute September, 1858. He was assistant engineer of new water works, Havana, Cuba, from 1863 to 1865, and engineer in charge of location and construction of the same from 1865 to the latter part of 1869; engineer in department of public works, New York city, from 1870 to 1872; chief engineer United States Nicaraugua Canal Surveying expedition from March, 1872, to July, 1874; chief engineer United States Panama Canal surveying expedition, in 1874–75; civil engineer United States navy, attached to the navy yard Washington, D. C., since July, 1875, embracing the duties of consulting engineer of the bureau of yards and docks, navy department, from 1881 to date, during which time he has designed and executed many important works for the navy department. During the last eight years he has made extensive surveys in Nicaraugua for the purpose of perfecting plans for improving the navigation of the river San Juan; the harbor of Greytown; of connecting lakes Managua and Nicaraugua by a canal for

local navigation, and for improving the original location of the inter-oceanic canal across that country. Was a delegate of the United States government to the Paris Inter-oceanic Canal Congress in 1879. In addttion to the above, has been temporarily engaged during his twenty-four years of constant professional experience, in various works of importance. On the 3d of July, 1879, President Grevy conferred upon him the rank of "Chevalier of the Legion of Honor," in recognition of his distinguished services during the progress of the Isthmus explorations, and of the skill with which the projects for the construction of ship canals at Panama and Nicaraugua were presented to the Paris Canal Congress. Is a member of the American Society of Civil Engineers, of the Engineers' Club of Philadelphia; of the Rensselaer Society of Engineers; of the Geographical Society of Antwerp, Belgium; of the United States Naval Institute, and other scientific societies. Is the author of many valuable papers relating to U. S. surveying expeditions and explorations connected with determining the most practicable route for connecting the two oceans by a canal. His latest production is an official report to the Hon. Secretary of the Navy, illustrated by eleven sheets of drawings, of the re-location of the Nicaraugua Canal, and printed in book form by act of Congress. He was married June 16th, 1866, to Elvira Martin, daughter of Frank Martin. Four children. P. O. address, U. S. Navy Department, Washington, D. C.

JOHN COX UNDERWOOD, C. E., A. M., son of Joseph Rogers and Elizabeth (Cox) Underwood, was born at Heights of Georgetown, now part of Washington City, D. C., September 12th, 1840. His early life was spent at Bowling Green, Ky. He attended the schools at that place until fourteen years of age, when he was sent to the high school at Jacksonville, Ills., where he remained two years, and entered the Institute in September, 1858. Was military engineer during a portion of the time of the civil war, 1862–65; engineer in charge of public works of Warren county for several years after the close of the war, and was city engineer of Bowling Green, Ky., from 1868–75. In 1872 he was elected grand master of the Independent Order of Odd Fellows, and afterward became a representative to Sovereign Grand Lodge, which position he still holds. He

established the *Kentucky Intelligencer*, a semi-weekly newspaper at Bowling Green, afterward consolidating it with the Louisville *Post*, and moved the paper to Louisville. He sold out his interest iu the *Post*, and adopted journalism as a profession. On December 22d, 1882, the Cincinnati *Daily News* began its career, he being general manager. He finally secured the Associated Press franchise, through the purchase of the *Morning Journal* and the *Gazette* franchise. He then coupled the name *Journal* with the original name, *News*, and on May 1st, 1883, the Cincinnati *News Journal* came into existence. Was a member of city council, Bowling Green, Ky., 1869–70 ; mayor of Bowling Green, 1871–72 ; lieutenant-governor of Kentucky, 1875–79. He acted, *ex officio*, as speaker of the Kentucky senate during said period. Received honorary degree of A. M. from Centre College, Danville, Ky. Made report and plan for a Kentucky universiiy. Married, May 16th, 1867, Dora A. Duncan, daughter of J. D. Duncan, of Warren county, Ky. Seven children ; four living. P. O. address, Covington, Ky.

Peter Dumont Vroom, Jr., C. E., was born in Trenton, N. J., April 18th, 1842. Was appointed from New Jersey as first lieutenant adjutant of First New Jersey Infantry, August, 1862. Major Second New Jersey Volunteer Cavalry, 1863; brevet lieutenant-colonel United States volunteers for gallant and meritorious services during the war ; brevet colonel United States volunteers for gallant and meritorious services during the war ; second lieutenant Third United States Cavalry, February, 1869 ; first lieutenant Third United States Cavalry, July, 1866 ; regimental adjutant Third United States Cavalry. Served in New Mexico and at Camp Halleck, Nevada ; on general recruiting service January, 1871, to January, 1883 ; with regiment, as captain, May 11th, 1876.

CLASS OF 1863.

Francis Everett Appleton, C. E., son of Moses Lake and Jane Sophia (Hill) Appleton, was born in Bangor, Penobscot County, Me., November 9th, 1841. Prepared at Bangor High School and entered the Institute in the class of 1863. In the summer of 1864 erected batteries at Belfast, Me., for the

United States government. For about three years, from May, 1866, in employ of Union Pacific railroad company, building road; 1869–70 in Bangor, Me., practicing civil engineering; next six months at Mamaroneck, N. Y., laying out private grounds; balance of 1870–71 doing office work in New York city for Northern Pacific railroad. From that time to last sickness, at Youngstown, Ohio, as civil engineer. During a part of 1865–66 was a merchant at Leavenworth, Kansas. He assisted in making plans for and in construction of the Union Pacific railroad. Was city engineer of Youngstown, Ohio, from 1872 to 1876. Member of the American Society of Civil Engineers. Married, March 14th, 1870, Harriet Leslie Kirkpatrick, daughter of Alfred Kirkpatrick, of Bangor, Me. He died April 7th, 1877, at Bangor, Me.

VAN BRUNT BERGEN, C. E., (Bay Ridge, N. Y.), son of Tennis G. and Elizabeth (Van Brunt) Bergen, was born in Bay Ridge, New Utrecht, Kings county, N. Y., April 29th, 1841. Graduated at the Brooklyn College and Polytechnic Institute, and entered the Institute in the fall of 1860. Since 1864 on the Brooklyn water works. Is now first assistant engineer. Building of sewers, laying of water mains, surveys for the extension of the water works, erection of engines, engine houses, sinking of wells and other work connected with the water works has been under his direction. Member of American Society of Civil Engineers. Married, August 3d, 1871, Elizabeth Vanderveer, daughter of Cornelius Vanderveer. One child. P. O. address, Bay Ridge, King's county, N. Y., or Department of City Works, Brooklyn, N. Y.

PERCY THOMAS BROWNE, C. E., (Brooklyn, N. Y.), was born October 10th, 1842, in Troy, N. Y. He was assistant, and afterward division engineer on the Union Pacific railroad. Was killed by the Indians on the plains July 23d, 1867.

JAMES PAYSON GOULD, C. E., son of Pliny P. and Lucinda (Stowe) Gould, was born at Phillipston, Worcester Co., Mass., June 13th, 1840. Prepared in scientific department Dartmouth College, Hanover, N. H.; occupied on farm when not at school; entered the Institute September, 1861. Was engaged on Brook-

lyn Water Works in the winter of 1863–64; Long Island railroad and Albany city railroad, March to August, 1864; Pennsylvania railroad, September to December, 1864; in the oil regions of Pennsylvania, two and one-half years; June, 1867, to 1869, assistant engineer Rondout & Oswego railroad, with headquarters at Kingston, N. Y.; 1870–71, chief engineer Delhi & Middletown railroad, headquarters at Delhi, N. Y.; from 1872 to 1881, partially employed as engineer at Kingston, N. Y., having in charge the Ulster & Delaware, Walkill Valley and Rhinebeck & Connecticut railroads; built Delhi & Middletown railroad (as yet uncompleted for want of funds,) and portions of Ulster & Delaware, Rhinebeck & Connecticut, Walkill Valley, and all of Stony Clove & Catskill Mountain railroad. Is a member of the American Society of Civil Engineers. Married, October 12th, 1880, Alice M. Frisselle, daughter of Dr. M. M. Frisselle; one child. P. O. address, Buxton, Dakota Territory.

Frank Hinckley, C. E., (Clinton, N. Y.), son of Elias Babcock and Catherine A. (Barns) Hinckley, was born in Westerly, Washington county, N. Y., September, 1838. Attended the Clinton Institute; was bookkeeper for S. A. Millard, at Clayville, N. Y., 1858–59. Entered the Institute in 1860. Engineer on fortifications in San Francisco harbor, 1864; assistant engineer Western Pacific railroad five years; resident engineer Northern Pacific railroad, Washington Territory, two years; commenced farming in 1872, at San Lorenzo, Cal., remaining eight years; was one year in Santa Clara county, and one year in Monterey county; In 1883 moved to San Bernardino county, where he now lives. Married, May 17th, 1870, Sarah Charlotte Meek, daughter of William Meek. Seven children. P. O. address, San Bernardino, Cal.

Francisco Rafael Naranjo, C. E., was born in Coquimbo, Chile, December 9th, 1840. Civil engineer, Coquimbo, Chile.

Augustus Elliott Warren Painter, C. E., (Pittsburg, Pa.), son of Jacob and Mary Harden (Hays) Painter, was born in Allegheny City, Pa., June 29th, 1844. Prepared with Professor B. F. Greene, Glenmore, Troy, N. Y., 1859–60. Entered Institute, Division B, September, 1861. Entered the iron works of J. Painter & Sons, as an owner and assistant superintendent, Sep-

tember, 1863, and is now general manager and the eldest member of the firm living. Married, June 22d, 1865, Mary Alice Blair, daughter of George T. Blair, of Troy, N. Y. One child. P. O. address, Pittsburg, Pa.

BENJAMIN COATES POTTS, C. E., son of Joseph C. Potts, born in Trenton, N. J., October 26, 1842. Entered the Institute in September, 1860. After graduation, he obtained a situation with the Trenton arms works, and remained with them until some time in November; entered the office of Fisk & Hatch, on Wall street, New York city, in the spring of 1864; in the fall went West, and followed surveying in the Pennsylvania oil regions until the summer of 1865; was agent for James Brown, at Manchester, N. J., during the summer and fall of 1865; was a member of the firm of Joseph C. Potts & Son, brokers, on Wall street, New York city, during the spring of 1866, and until the spring of 1867.

Mr. Potts made a preliminary survey of the Cairo and Fulton railroad of Arkansas in the fall and winter of 1868 and 1869, and was occupied in and about the same until the spring of 1870. He started a paper mill in Millburn, Essex county, N. J., in the spring of 1870, and manufactured paper until 1875; was then secretary of two land companies. For some years past has been attorney and counseller at law in Newark, N. J., where he still resides.

GEORGE T. STODDER, C. E., was born in Boston, Mass. Has never followed his profession, and is not engaged in business. P. O. address, Bangor, Me.

EDWIN THACHER, C. E., (Herman, N. Y.), son of Seymour and Elizabeth (Smith) Thacher, was born in De Kalb, St. Lawrence county, N. Y., October 12th, 1839. Prepared at Gouverneur Wesleyan Seminary, St. Lawrence county, N. Y. Entered the Institute in 1860, Division C. Engaged on Cedar Rapids & Missouri River railroad, Iowa, from 1863 to 1864: United States military railroads, Nashville, Tenn., 1864–65; Louisville, Cincinnati & Lexington railroad, Louisville, Ky., 1865–67; Louisville Bridge company, Louisville, Ky., 1867–70; Louisville bridge and iron company, Louisville, Ky., 1870–79; Keystone bridge company, Pittsburg, Pa., 1878 to date. As calculating engineer for many years.

The bridges designed by him are too numerous to mention. Member of the American Society of Civil Engineers, and the Engineers' Society of Western Pennsylvania. Married, April 22d, 1872, Anna S. Bartholomew, daughter of Harris Bartholomew. One child. P. O. address, Keystone bridge company, Pittsburg, Pa.

IGNACIO M. DE VARONA A., C. E., son of Ignacio M. and Angela M. (de Aguero) de Varona, was born at Puerto Principe, Island of Cuba, February 4, 1842. Prepared at Mr. Berger's French school, Madison Avenue, N. Y., and entered the Institute September, 1860. Began professional work in 1863, and has continued practice since, with the exception of the years 1868–69, in Cuba, South America, Europe and the United States, mostly in railroad work. For the past two years has been assistant engineer on the Brooklyn city works, in charge of the proposed Aqueduct extension. Built, as chief engineer, the extension to the Bay of Nuevitas, terminal station of the Nuevitas & Puerto Principe railroad, finished in 1867. Married, June 26th, 1865, Mannela de Arostegui, daughter of Don Miguel de Arostegui, of Puerto Principe, Cuba. Three children. P. O. address, I. M. de Varona A., assistant engineer, department of city works, Brooklyn, N. Y.

FREDERIC WILLIS VAUGHAN, C. E., (Louisville, Ky.), son of Lewis and Susan (Starrett) Vaughan, was born in Warren, Knox county, Me., January 16th, 1844. Prepared at Warren Academy, Warren, Me., and entered the Institute September, 1860. Was assistant engineer Louisville Bridge and Iron Co., October, 1865, to March, 1866; principal assistant engineer same company, to March, 1870; vice-president to March, 1879, and president of the company from March, 1879, to date. Consulting engineer Henderson Bridge company, September, 1881, to April, 1882; chief engineer same company, April, 1882, to present time. Consulting engineer Louisville & Nashville railroad company, January, 1883, to present date. The Louisville bridge, Louisville, Ky.; Henderson bridge, Henderson, Ky.; Henderson bridge railroad, Evansville, Ind., to Henderson, Ky.; various bridges, iron and combination, aggregating twelve lineal miles, constructed by the Louisville Bridge and Iron company, were

designed and built under his direction. Member of the American Society of Civil Engineers. Married, May 3d, 1869, Maggie I. Edgar, daughter of George Edgar. Two children. P. O. address, Louisville, Ky.

CLASS OF 1864.

PETER HENRY FOX, C. E., was born in Harrisburg, Pa., July 13th, 1836. Prepared for the Institute in the schools of his native place. Has not followed his profession, but has engaged in agricultural pursuits. P. O. address, Harrisburg, Pa.

RALPH GOODING PACKARD, C. E., son of Ambrose and Elizabeth B. (Smith) Packard, was born at Niagara Falls, Niagara county, N. Y., October 26th, 1840. Entered the Institute April 1st, 1862. Civil engineer United States navy yard, Brooklyn, August, 1864, to May, 1869; partner Morris & Cummings, No. 45 Duane street, New York city, contractors for dredging, May, 1869, to February, 1872; superintendent Atlantic dredging company, January, 1863, to date. Married, March 15th, 1869, Harriet L. Parker. Two children. P. O. address, 361 Fulton street, Brooklyn, N. Y.

ROBERT VAN BUREN, C. E., son of John D. and Elvira L. (Aymar) Van Buren, was born in New York city, March 25th, 1843. Prepared under S. R. Calthrop, and entered the Institute in 1862. Since 1865 in the public works of the city of Brooklyn; spent two months in the mining districts of Lake Superior, and three months in the oil region of Pennsylvania; practiced in Brooklyn as assistant engineer, was promoted to the position of chief engineer in 1877, and still holds that position; has designed a system of relief sewers for the city of Brooklyn, a plan for the extension of the water works, and established the system of driven wells for the city water works; erected several draw bridges, pumping engines, and the general work belonging to a growing city; has under his charge the water supply, sewerage, docks, piers and canals, paving of streets and the repairs of the same; gas contracts, etc. Member of the American Institute of Civil Engineers. Married February 4th, 1875, Louise Aymar, daughter of Samuel Aymar. Three children. He delivered the valedictory address to the class of '64. P. O. address, No. 153 Remsen street, Brooklyn, N. Y.

CHRISTOPHER CHAMPLIN WAITE, C. E., (Toledo, Ohio), son of Morrison Remick and Amelia (Champlin) Waite, was born in Maumee City, Lucas county, Ohio, September 24th, 1843, and entered the Institute in September, 1860. July, 1864, assistant engineer Rensselaer & Saratoga railroad; 1865, assistant engineer Croton water works board; 1867, chief engineer Columbus & Toledo railroad; 1868, chief engineer Toledo, Akron & Atlantic railroad; 1869, cashier P. C. & St. L. railroad; 1870, chief engineer C. &. M. V. railroad; 1871, superintendent C. & M. V. railroad; 1881, superintendent C. & M. V. railroad and Little Miami railroad; 1881, assistant to president N. Y., L. E. & W. railroad; 1882, vice president Cincinnati, Hamilton & Dayton railroad. Member of American Society of Civil Engineers. Married, October 22d, 1868, Lillie C. Guthrie, daughter of Julius C. Guthrie. Two children. P. O. address, Cincinnati, Ohio.

DRAKE WHITNEY, C. E., son of Solon M. N. and Frances E. (Drake) Whitney, was born at Niagara Falls, Niagara county, N. Y., August 23d, 1843. Prepared at Dr. T. C. Reed's Walnut Hill school, Geneva, N. Y., and entered the Institute September, 1860. In 1864, was for a few months near Houghton, on Lake Superior; in 1865, went to Germany, and studied one year at Göttingen, under Prof. Wohler; 1866–67, in the Mining Academy at Freiberg, Saxony, and then entered the Ecole des Mines, at Paris, remaining six months. In 1870 he was for four months on a branch of the New York & Erie railroad; 1871–72, resident engineer on Canada Southern railroad; was also assistant engineer on the location of the Michigan Midland railroad, from St. Clair to Grand Haven; has now been, for eight years, corporation engineer of Niagara Falls; also engaged in general practice. In February and March, 1884, he located and gave elevations for the sixteen stone piers for the iron towers which are to replace the present wooden towers of the upper suspension bridge at Niagara Falls. In 1883, ran a line of levels from the "B. M.'s" on the Erie Canal to the top of American Falls, and found them to be 512.45 feet above tide-water; these levels were used on the survey for Niagara Park. P. O. address, Lock Box 97, Niagara Falls, N. Y.

HENRY WILLIAM WILSON, C. E., (Altoona, Pa.,) son of William Hasell and Jane (Miller) Wilson, was born in Haverford, Delaware county, Pa., August 25th, 1843. Studied in family school with private teachers; with Prof. B. F. Green two and one-half years, (one year and a half at Glenmore, and one year at Beaverwyck), between Albany and Troy. Entered the Institute September, 1862. Entered the service of the Southern Pennsylvania railroad in 1865, as rodman, on surveys between the Alleghenies and Chambersburg, and took the position of third assistant engineer in September, same year; in January, 1866, was transferred to West Pennsylvania railroad, on surveys in Butler and Allegheny counties; was made first assistant engineer in February. June, 1866, in office of principal assistant engineer Pennsylvania railroad, at Altoona, which office was transferred to Philadelphia, December, 1867. In this office he was engaged as assistant engineer in bridge designing and various kinds of field work, surveying, locating and constructing on the Pennsylvania railroad. In 1876, he entered the office of Wilson Bros. & Co., of Philadelphia, as principal assistant engineer, where he has since been engaged in designing bridges and other structures, mostly for the Pennsylvania railroad. Is a member of the American Society of Civil Engineers. Married, October 15th, 1874, Hannah McFarlan Morton, daughter of Rev. Henry J. Morton, D. D., of Philadelphia. One child. P. O. address, 435 Chestnut street, Philadelphia, Pa.

CLASS OF 1865.

GEORGE BRADFORD BRAINERD, C. E., (Brooklyn, N. Y.,) was born in Haddam, Conn., November 3d, 1845, and has occupied the following positions according to the Register; student at the school of mines, Columbia College, New York city, and civil engineer, purveyor's office, Brooklyn Water Works, Brooklyn, N. Y.

SAMUEL BUEL, JR., C. E., son of Rev. Samuel and Jane Eliza (Wilmot) Buel, was born at Cumberland, Md., August 9th, 1845. In 1865 he was assistant engineer of the Philadelphia and Reading railroad, Pottstown, Pa.; 1871, engineer to the Michigan

bridge and construction company, Detroit, Mich.; 1865, civil engineer, New York city. P. O. address, No. 1,329 Broadway, New York city.

CLIFFORD BUXTON, C. E., son of Benjamin F. and Julia (Sevey) Buxton, was born at Warren, Knox county, Me., June 15th, 1844. Prepared at Warren Academy, and practiced land surveying from 1860 to 1862. Entered the Institute in September, 1862. September, 1865, Troy & Boston railroad, Troy, N. Y., three months; January, 1866, Pittsburg, Fort Wayne & Chicago railroad, Pittsburg, Pa., one month; February, 1866, Cleveland & Mahoning railroad, Pittsburg, Pa., one year and two months; October, 1867, Knox & Lincoln railroad, Warren, Maine, three years and three months; July, 1871, United States engineers' department, Philadelphia, Pa., four months; November, 1871, Cleveland, Mount Vernon & Delaware railroad, Mount Vernon, Ohio, three years and three months; June, 1875, Scioto Valley railroad, Columbus, Ohio, three years and nine months; since March, 1879, Ohio Central railroad, Toledo, Ohio. Member of the Ohio Society of Surveyors and Civil Engineers. Married, December 9th, 1868, Lucinda M. Andrews, daughter of James Andrews. One child. P. O. address, Toledo, Ohio.

THOMAS MUTTER CLEEMANN, C. E., (Philadelphia, Pa.), son of Gustavus B. C. and Claramond (Colquhoun) Cleeman, was born in Philadelphia, Pa., July 1st, 1843. Prepared at the University of Pennsylvania, and entered the Institute in September, 1863. Assistant engineer Pennsylvania railroad, July, 1865 ; assistant engineer Allegheny Valley railroad, 1866; assistant engineer Pennsylvania railroad, 1867–72; division engineer Callao, Lima & Oroya railroad, Peru, 1872–73; principal assistant engineer main building, United States Centennial Exhibition, Philadelphia, 1874; contractors' engineer Southern railroad of Chile in 1875; acting assistant engineer in Philadelphia water department, 1876–79; resident engineer Richmond & Allegheny railroad, Virginia, in 1880. Inspecting and consulting engineer since. Member of the Rensselaer Society of Engineers, and of the Engineers' Club of Philadelphia. Published "Railroad Engineers' Practice," in 1880, in New York; second edition, 1883; third edition, 1884. P. O. address, No. 2,135, Spruce street, Philadelphia, Pa.

HENRY HARRISON FARNUM, C. E., son of Samuel B. and Asneath (Caudebec) Farnum, was born at Port Jervis, Orange county, N. Y., April 3d, 1844. Prepared at Flushing Institute, Flushing, L. I., and entered the Institute in September, 1862. Has since followed his profession, and is at present chief engineer of the South Side railroad of Long Island. P. O. address, Port Jervis, N. Y.

JOHN WESLEY GRISWOLD, B. S., (Erie, Penn.,) son of Seelye and Nancy (Bettis) Griswold, was born in Versailles, Cattaraugus county, N. Y., July 5th, 1841. Prepared at Fredonia Academy, Fredonia, Chautauqua county, N. Y. Employee in a dry goods store at Erie, Penn., as cashier and bookkeeper, and entered the Institute September, 1861. In 1866, was employed by the New York & Schuylkill Coal company, at Woodside, Schuylkill county, Penn., for six months. In August, 1866, engaged in the manufacture of worsted yarns at Philadelphia, Penn.; in 1870, manufactured the same class of goods at Darby, Delaware county, Penn. In 1873, was taken into partnership, and in 1880 the manufacture of spun silk was successfully inaugurated, the name now being "The Griswold Silk and Worsted Co., Limited," their office being at 322 Chestnut street, Philadelphia, Penn. In June, 1882, went to Colorodo as chief engineer of the Cleveland Consolidated Mining company, of Colorado. In July, 1883, returned to the East, and since then has been engaged in making maps of the "Proposed Extension of Conduit," Brooklyn water works, and is still connected with the engineering bureau. Designed and made working drawings of the new silk mill at Darby, Penn.; also the Thompson granite block, at Silverton, Col. Served two terms as chief burgess of Darby, Penn.; also as councilman two terms. Member of Franklin Institute, Philadelphia. Vice president of the Barus mining company, and incorporator of the Cleveland mining company. P. O. address, Municipal Building, Engineers' Department, Brooklyn, N. Y.

HORACE LOOMIS, C. E. *See Instructors, page 169.*

MARSHALL HUBERT MALLORY, C. E., was born in Watertown, Conn., February 17, 1844. He has for many years been proprietor of *The Churchman*, the principal organ of the Episcopal Church, published in New York city, and for some years past,

has also been proprietor of the Madison Square theatre, which under his management and direction, has been so popular and successful. P. O. address, Lafayette Place, New York city.

JOSE ROBEIRO DA SA PIRAJA, JR., C. E., was born in Bahia, Brazil, July 24th, 1843. Since graduation, has held the position of assistant commissary general of Brazil, and of assistant engineer on the Don Pedro II railroad, at Rio de Janeiro, Brazil.

THOMAS COLE RAYMOND, C. E., was born in Boston, Mass., September 12th, 1845. Prepared for the Institute at the English High School, Boston, and entered the Institute September, 1862. After graduation, he studied at the Freiberg, Saxony, school of mines, and is now a consulting mining engineer. P. O. address, 95 Milk street, Boston, Mass.

JOHN CHAMBERS THOMPSON, C. E., (Cincinnati, O.,) son of Jared and Jane (Chambers) Anthony, was born in Philadelphia, Pa., February 5th, 1844. On the death of both parents, John Chambers Anthony was adopted by the Rev. Dr. Thompson, at that time preaching in Philadelphia, and his name was changed to John Chambers Thompson. He entered the Institute September, 1862. September, 1865–67, was assistant superintendent on construction of Bessemer steel works of Messrs. Winslow, Griswold & Holley, Troy, N. Y.; 1867, superintendent of the same; 1868, assistant engineer on Croton water works, New York city; 1870, assistant engineer, department of public works, New York city; 1872, superintendent Bessemer steel works, Troy, N. Y.; 1874, superintendent of railroad department of Crown Point Iron company, Crown Point, N. Y.; 1877–79, assistant engineer of Croton water works, New York city, and was for a time connected with the steel works at Cleveland, O. His health failing, he went to Minnesota, where he died of consumption in 1880.

ALFRED TREDWAY WHITE, C. E., son of Alexander M. and Elizabeth T. White, was born in Brooklyn, N. Y., May 28th, 1846. Prepared at Brooklyn Collegiate Institute, and entered the Institute in September, 1863. Member of the firm of W. A. & A. M. White, merchants, New York city, since 1868. Published in 1877, in Brooklyn, "Improved Dwellings for the Labor-

ing Classes," and a second edition, enlarged, in New York in 1879. Married, May 29th, 1878, Annie Jean Lyman, daughter of E. H. R. Lyman, of Brooklyn, N. Y. P. O. address, 40 Remsen street, Brooklyn, N. Y.

CLASS OF 1866.

ALEXANDER ADDISON, C. E., son of William and Harriet (Inglis) Addison, was born in Pittsburg, Allegheny county, Pa., December 25th, 1845. Entered the Institute in 1862. In 1866, after graduating, went, in September, to Clausthal am Hartz, Germany, and died there June 10th, 1867, while prosecuting his studies in the mining school at that place.

CHARLES CATHRAL CRAFT, C. E., son of James S. and Emily (Miltenberger) Craft, was born in Pittsburg, Allegheny county, Pa., October 21st, 1843. Prepared at Yonkers Military Institute, and with private tutor while traveling in Europe. Entered the Institute in September, 1862. In fall of 1866 was assistant engineer in charge of construction of a section of the Allegheny Valley railroad; July, 1867 to 1870, assistant engineer of the city of Pittsburg, Pa.; 1871, engineer in charge of Pennsylvania avenue improvement until its completion, and since that time has been laying out, improving and building up the town of Crafton, Allegheny county, Pa., in the capacity of engineer; farmer, contractor, etc.; was school director and justice of the peace for Chartiers, Allegheny county, Pa. Married, April 28th, 1866, Mary Ellen Mallary, daughter of P. S. Mallary, of Troy, N. Y. Four children; three living. P. O. address, Box 754, Pittsburg, Pa.

THEODORE NEWEL ELY, C. E., son of Adriel and Evelina (Foster) Ely, was born in Watertown, Jefferson county, N. Y., June 23d, 1846. Prepared at the Jefferson County Institute, Watertown, N. Y., and entered the Institute September, 1863. Entered upon the work of his profession 1866, in the Fort Pitt foundry, Pittsburg, Pa.; engineer, Philadelphia & Erie railroad, June, 1868; superintendent middle division Philadelphia & Erie railroad, July, 1869; assistant superintendent same road, 1870,

and superintendent of motive power, 1873; superintendent of motive power Pennsylvania railroad, 1875, and general superintendent of motive power, same road, 1882. Member American Society of Civil Engineers, American Society Mining Engineers, American Society Mechanical Engineers, American Association for the Advancement of Science. Married, May 19th, 1874, Henrietta V. S. Brandes, daughter of Charles Brandes, M. D., of Erie, Pa. Wife died June 13th, 1880; four children. P. O. address, Altoona, Pa.

HERBERT CLARK FELTON, C. E., son of Amory and Nancy P. (Boynton) Felton, was born in Troy. Rensselaer county, N. Y., November 3d, 1846. Prepared at the public schools of Troy, and entered the Institute in 1863. In July, 1866, entered the Novelty iron works, New York city, as assistant to the superintendent. August, 1868, accepted the position of assistant engineer of Medford & Camden railroad, (N. J.,) in the preliminary and location surveys; in the summer of 1870 was with the Weehawken (N. J.) railroad company, and made the preliminary surveys for a road from Hoboken through Weehawken, and over the Palisades to the Hackensack Meadows. In the fall of 1870 engaged in miscellaneous surveying in New York and New Jersey. January, 1871, was elected secretary of the New York & Fort Lee railroad company, and the following spring was also appointed engineer in charge of said road, and was engaged in adjusting right-of-way matters of the part constructed, and in making preliminary surveys for extending the road. Resigned both positions in December, 1871. From January, 1872, to November, 1872, was chief engineer of the Dutchess & Columbia railroad. December, 1872, accepted the position of chief engineer of the Manchester & Camden railroad company, (N. J.) December, 1873, secretary and treasurer of the Kaign's Point & Philadelphia ferry company. In August, 1874, was elected superintendent of the same company, retaining the other positions, and is still occupying the same offices. Married, April 10th, 1872, Harriet Louisa Job, daughter of Thomas Job, of Troy, N. Y. P. O. address, Camden, N. J.

JOHN QUINCEY ADAMS FORD, C. E., was born at Limerick, York county, Me., December 11th, 1842. October 10th, 1866,

appointed acting third assistant engineer in the United States navy, and ordered to the United States Naval Academy at Annapolis, Md., for instruction; graduated from Naval Academy June 2d, 1868; June, 19th, 1868, warranted a third assistant engineer in United States navy, from June 2d, 1868; July 2d, 1868, ordered to United States steamship Pensacola; October 15th, 1869, commissioned a second assistant engineer from June 2d, 1869; transferred to the United States steamship Saranac; detached from the Saranac, ordered home, and to report arrival; February 27th, 1875, placed on waiting orders from date of reaching home; April 1st, 1875, granted leave of absence for six months; August 19th, 1875, ordered to examination for promotion; November 20th, 1875, ordered to navy yard, Portsmouth, N. H.; January 13th, 1876, commissioned a passed assistant engineer from February 19th, 1875. Died at Portsmouth, N. H., February 23d, 1878.

WILLIAM POND HARRIS, C. E., (Cumberland, Md.), son of William Henry and Mary Amelia (Pond) Harris, was born in Worcester, Mass., February 12th, 1846. Prepared at Williston Seminary, East Hampton, Mass., and entered the Institute in September, 1862. In July, 1866, began practice of his profession: at Brooklyn park, two years; Riverside park, near Chicago, two years; contracting at various places, three years; since 1876, engaged in operating railroads, serving on the New York and Greenwood Lake to December, 1880; on the C. & O. until July, 1883; on the L. & N. during 1884; at present superintendent B. & O. main stem division, west of Cumberland, Md. Member of American Society of Civil Engineers. Married, at Rockford, Ill., May 7th, 1873, Ida F. Potter, daughter of Lyman H. Potter. Three children. P. O. address, Cumberland, Md.

GEORGE MARSHALL HUNT, C. E. *See Instructors, page 169.*

THOMAS LOOMIS KNAP, C. E., (Santa Barbara, Cal.), son of Thomas L. and Mary (Averell) Knap, was born at Brownville, Jefferson county, N. Y., June 29th, 1843. Prepared at public school and Brownville Seminary. Entered the Institute in September, 1862. Began practice of his profession as draughtsman at Fort Pitt foundry, Pittsburg, Pa., in October, 1866; superintendent Rodman furnace, Blair county, Pa., 1871 to 1874; ranch

farmer near Santa Barbara, Cal., from 1876 to date. Married, summer of 1876, to Emmeline E. Moss, daughter of Horace O. Moss, of New Berlin, N. Y. One child.

BENJAMIN N. LILIENTHAL, C. E., was born in New York city, April 1st, 1848. Entered the Institute September, 1862. Soon after graduation, he went to Freiberg, Germany, and studied mining engineering, passing his final examinations in August, 1869. Returning to this country in June, 1870, he went to the west and engaged in superintending reduction works, mills and smelting. He was for some time superintendent of the New York mill for the Golden Chariot company, at Silver City, Idaho. After leaving Silver City, he went to Nevada, and died in White Pine District, Nevada, in the spring of 1876.

ALBON PLATT MAN, JR., A. B., C. E., son of Albon Platt and Mary Louise (Brower) Man, was born in New York city, November 14th, 1845. Educated at public schools in New York city, and graduated at the College of the City of New York in 1864, entering the Institute, Division B, in September of that year. July, 1866, entered service of the Southern Minnesota railroad, as herder; was afterward assistant engineer until June, 1872; then on Mississippi bridge at La Crosse, Wis., on surveys and plans, until fall. June, 1873, to December, 1875, chief engineer Central railroad of Minnesota, and superintendent of same road until July, 1876, when it was sold. From November, 1876 to February, 1878, was assistant engineer on the Rochester & State Line (now N. Y. C.) railroad; and from February, 1878, to June, 1879, chief engineer Boston & New York Air Line railroad. From June, 1879, to October, 1884, was assistant engineer and first assistant engineer St. Louis & San Francisco railroad; and from October, 1884, to date, purchasing agent of the same road, with residence in St. Louis, Mo. Has done various small work, surveys of railroad plats and map work, in intervals not shown as continued work above. Is a member of the American Society of Civil Engineers and the Engineers' Club, of St. Louis. Married, October 31st, 1876, Marcella, daughter of Hon. James Brown, of Mankato, Minn. One child. P. O. address, Purchasing Agent, St. Louis and San Francisco railroad company, Temple Building, St. Louis, Mo.

CHARLES PENROSE PERKINS, A. M., C. E., son of Abram R. and Margaret R. Perkins, was born in Philadelphia, Pa., October 2d, 1844. Graduated A. B. from the University of Pennsylvania in 1863. Entered the Institute in September, 1863. In 1863 rodman for a few months in a party locating a railroad in Bradford county, Pa.; 1868, February to September, assistant on location and construction of Queen Anne & Kent county railroad, Md., and location of branch of Delaware railroad; 1869, in February, assistant to resident engineer middle division Pennsylvania railroad; January and February, 1870, assistant engineer Pittsburg division, Pennsylvania railroad; December 1st became superintendent of the McHaffie direct steel castings company, of Chester, Pa., remaining so until June 1st, 1873, when he returned to the Pennsylvania railroad as assistant engineer, having charge of the erection of passenger stations, Jersey City; August, 1874, assistant engineer Elmira and Canandaigua divisions Northern Central railroad, until September, 1881, when he was made engineer, maintainence of way, Philadelphia and Erie division of Pennsylvania railroad, and of the Susquehanna, Shamokin, Elmira & Canandaigua divisions of the Northern Central railroad, to which, January 1st, 1883, the Baltimore division was added, making his title engineer, maintainence of way, Philadelphia & Erie railroad division of Pennsylvania railroad, and of Northern Central railroad; since then he has been transferred to the real estate department of the Pennsylvania railroad, office in Philadelphia, without title. Received degree of A. M. from the University of Pennsylvania. Member of the American Society of Civil Engineers. Married, November 13th, 1878, to Helen A. Wright, daughter of John A. Wright. One child; died March 2d, 1883. P. O. address, office of Pennsylvania railroad, Philadelphia, Pa.

JOSEPH CURTIS PLATT, JR., C. E. *See Trustees, page 113,*

CHARLES WHITESIDE RAE, C. E., (Champlain, N. Y.,) son of Luzerne and Martha C. (Whiteside) Rae, was born in Hartford, Hartford county, Conn., June 30th, 1847. Prepared at the Champlain Academy, Champlain, N. Y., and entered the Institute in 1863. Was appointed, 1866, acting third assistant engineer in the United States navy, and ordered to the naval acade-

my at Annapolis, Md., for instruction; June, 1868, graduated from naval academy, and was warranted third assistant engineer. July, 1868, ordered to U. S. S. Contoocook (afterward the Albany), flagship of the North Atlantic fleet; September, 1869, detached from the Albany, and ordered as assistant inspector of machinery afloat at the navy yard at Washington, D. C.; October, 1869. commissioned second assistant engineer in U. S. navy from June 2d, 1869. March, 1870, detached from navy yard at Washington, and ordered to the U. S. S. Terror; order revoked and he resumed duty at navy yard. September, 1870, was detached from navy yard at Washington and ordered to duty in the Tehuantepec & Nicaraugua canal surveying expedition: in 1871, he was detached from that expedition and placed on waiting orders; then ordered to the U. S. S. Wabash, at Boston, Mass., fitting out as flagship of the European fleet; 1872, detached from the Wabash and ordered to the Juniata, European fleet; April, 1872, detached from the Juniata and ordered to the Plymouth, European fleet; June, 1872, detached from the Plymouth and ordered to the Wabash flagship; January, 1874, detached from the Wabash at Key West, Fla., and ordered to the United States naval academy, Annapolis, Md., as instructor in marine engineering; January, 1876, ordered to examination for promotion; May, 1879, commissioned passed assistant engineer in the U. S. navy from December 25th, 1875; June, 1878, detached from the naval academy and ordered to U. S. S. Pensacola, flagship of the Pacific fleet; February, 1881, detached from the Pensacola at Panama, and ordered to the Wachusett, Pacific fleet; June, 1881, detached from the Wachusett and ordered to special duty in the Bureau of Steam Engineering, Navy Department, Washington, D. C., and later on the flag-ship Lancaster, Mediterranean squadron. Member of American Society of Mechanical Engineers. P. O. address, Bureau of Steam Engineering, Navy Department, Washington, D. C.

JOHN STEWART SCHAEFFER, C. E., son of William A. and Fannie (Stewart) Schaeffer, was born in Stillwater, Sussex county, N. J., June 17th, 1843. Prepared at Blair Presbyterial Academy, and entered the Institute in September, 1862. Entered upon the work of his profession July 20th, 1866, on the Morris & Essex railroad, now the Delaware, Lackawana & Western rail-

road In constructing a branch from Denville to Boonton, after six weeks connection, was made resident engineer, and assisted in the work of widening rock cuts between Hackettstown and Easton, remaining until the completion of the work, January, 1868. From this time until 1870, did a general engineering business, and acted as one of the three city surveyors in Jersey City, N. J.; in May, 1870, was appointed principal assistant engineer on the Newark water works, and remained until 1874, constructing the high and low service reservoirs; January, 1875, was appointed to the position of city surveyor of Newark, N. J., and remained in that position until 1877, when he established in said city an office for a general engineering business, remaining until October, 1880, when he was appointed resident engineer in charge of construction of one division of the New York, Lackawana & Western railroad, located at Binghamton, N. Y., and remained until its completion in 1883, having in charge twenty-seven miles; May, 1873, appointed resident engineer in New York of the West Shore & Buffalo railroad, in charge of the road through Cayuga county, and upon completion of the road he resigned December 6th, to take effect January 1st, 1884; January 20th the common council appointed him city surveyor of the city of Newark, N. J., which position he now holds. He built the Clay street trunk sewer, the largest in Newark; the bridge spanning the Chenango and Susquehanna rivers at Binghamton were built under his direction, and reservoirs and all bridges on the works above mentioned. Married, November 15th, 1868, Georgia E. Walsh, daughter of Josiah Walsh. One child. P. O. address, 191 Littleton avenue, Newark, N. J.

HOLLAND NEWTON STEVENSON, C. E., son of John McAllister and Seraph H. (Newton) Stevenson, was born in Cambridge, Washington county, N. Y., September 3d, 1844. Prepared at Walnut Hill School, Geneva, N. Y., 1860–62, Rev. Thomas Reed, D. D., Master, and at Norwich University, Norwich, Vt., class of 1865; previous to this had attended Cambridge Academy, Cambridge, Washington Co., N. Y., and Burr Seminary, Manchester, Vt. Entered the Institute in September, 1863, Division C. October 10th, 1866, entered the United States navy as a third assistant engineer, and has remained in the naval service to date. Was commissioned a second assistant engineer June 3d, 1869,

and a passed assistant engineer December 13th, 1874, under which commission he is still serving; on entering the service in 1866, formed one of a class who received a two years' special course in mechanical engineering at the naval academy; was in the Pacific squadron in 1868–71, visiting all the principal posts, Valparaiso, Chile, to Alaska; 1871–74, special duty, navy department, Washington, D. C., and Morgan iron works, New York city; 1874–75, in the United States steamship Swatara made a cruise around the world with the "Transit of Venus" expedition; 1875–8, coast survey service on coasts of Maine, Massachusetts, Florida and Alabama; 178–79, special duty New York city; 1879–81, United States steamship Trenton, flagship European station; 1882, home squadron; 1883, to date, special duty coast survey service. Designed and superintended construction and erection of compound engines for coast survey steamer C. P. Patterson. This vessel is now completed, and he has accompanied her to the Pacific for work in the vicinity of Alaska, she being specially designed for service in those waters. In 1869, while in Pacific squadron, obtained leave to accompany a Peruvian government exploring expedition to the interior, to explore the Amazon river as to availability for steamboat navigation. In 1874, while on the United States steamship Swatara, that conveyed five parties to the southern hemisphere to observe the transit of Venus, assisted in taking the observations to the party under charge of Professor William Harkness, United States navy, at Hobart Town, Tasmania, Australasia. P. O. address, Pittsfield, Berkshire county, Mass.

Francis Nathaniel Trevor, C. E., son of Joseph and Caroline M. (Breading) Trevor, was born in Hamilton, Madison county, N. Y., May 17th, 1844. Prepared at Lockport Union School, and entered the Institute in September, 1862. September, 1866, entered engineer corps, United States navy; ordered to Annapolis, Md., where a year was spent in technical preparation for the naval service; then ordered to Brooklyn navy yard; July, 1868, was ordered to sea, for service in South Pacific squadron, remaining until August, 1869, when he resigned, and returned to Lockport, N. Y.. for the purpose of engaging in manufacturing special machinery, with which he has been occupied to the present time. Water commissioner, city of Lockport, N. Y., June, 1882, to June, 1884. P. O. address, Lockport, N. Y.

WILLIAM HALSTED WILEY, C. E., (Orange, N. J.), was born in New York city July 10th, 1842. Prepared in ward schools of New York city, Thirteenth and Twentieth streets, and College of City of New York. In United States volunteer service during war; brevet major United States volunteers. Entered the Institute in 1864. Engaged in the work of his profession in 1866, at Brooklyn water works, six months; 1868, Croton water works, eighteen months; 1870, Newark, (N. J.), water works, six months; Philadelphia & Reading railroad, 1870, six months; New Hope & Philadelphia railroad, 1871, six months; Tunnel Hill coal company, New Lexington, Ohio, 1873–74. Now member of firm of John Wiley & Sons, scientific publishers. Member of American Society of Civil Engineers, American Institute of Mining Engineers, and American Society of Mechanical Engineers. Married, June 1st, 1870, Joanna K. Clarke, daughter of Elisha Clarke. One child. P. O. address, 15 Astor Place, New York city.

CLASS OF 1867.

ALBERTO W. FERREIRA D' AGUIAR, A. M., C. E., was born in New York city, January 12th, 1845, a citizen, however, of the Empire of Brazil, S. A. He graduated at St. John's College, Fordham, N. Y., receiving the degree of A. B., and afterwards from the same institution the degree of A. M. Entered Division C. of the Institute in February, 1865. He afterward returned to Brazil to engage in his profession, and was appointed chief engineer of the province of Para, Brazil, S. A., in 1868. Deceased.

PALMER HENRY BAERMANN, C. E., son of Philip H. and R. A. (Palmer) Baermann, was born in West Troy, Albany county, N. Y., August 4th, 1847. Prepared at Troy High School, and entered the Institute September, 1864. Was engaged from July, 1867, on the New York & Oswego Midland railroad about two years; New York Central railroad about one year; village surveyor, West Troy; assistant engineer New York State canals, engineer in charge of water works at Hudson River State Hospital, Poughkeepsie, N. Y., two and one-half years; was chief

engineer of water works in West Troy, Johnstown. Richfield Springs, Cooperstown, Norwich, Sherburn, and Lansingburgh; and assistant superintendent Troy water works, of which he is at present chief engineer. Designed works for Amsterdam, Greene, Deposit, and Oneonta. The last ten years has devoted himself to water and sewerage works. Member of Rensselaer Society of Engineers and the Engineers' Club of Philadelphia. Has written several articles which have appeared in the publications of the above societies. Married, December 28th, 1871, Annie E. Wiswall, daughter of Eben Wiswall. Three children. P. O. address, Troy Water Department, Troy, N. Y.

ARTHUR BEARDSLEY, C. E., (Poughkeepsie, N. Y.), son of Jonathan and Laura Hull (Coutaut) Beardsley, was born in Esopus, Ulster county, N. Y., November 1st, 1843. Prepared at Duchess County Academy, Poughkeepsie, N. Y., A. B. Wiggins' family school, Poughkeepsie, N. Y., Bowdoin college, Brunswick, Me., class of 1866, and Professor William H. Crosby, Poughkeepsie, N. Y. Entered the Institute in February, 1864, up to which time his studies had been mainly in the classics. Appointed assistant engineer at west end, west shaft and central shaft, Hoosac tunnel, Mass., after graduation, which position he resigned in June, 1868; in 1869, civil engineer and architect in Poughkeepsie, N. Y., and travelling in western states; June, 1869, appointed instructor in civil engineering, physics and industrial mechanics in the University of Minnesota, and in June, 1870, was made professor of civil engineering and industrial mechanics in the same university; June, 1872, resigned this position to accept that of professor of applied mathematics and physics in Swarthmore College, Pa.; the professorship was soon changed to that of mechanics and engineering, and in 1885 it became civil and mechanical engineering. In both institutions the work of organizing the engineering departments, and of arranging and developing the courses of study for the same, has fallen upon him. He designed and built several buildings and residences at Swarthmore and elsewhere. Member of the American Society of Civil Engineers, (associate); American Society Mechanical Engineers, (member); Engineers Club, Philadelphia; Franklin Institute of Pennsylvania; Rensselaer Society of Engineers, (associate). A bookbinder by trade before

entering college. Librarian of Swarthmore College for several years. Married, June 29th, 1870, Emma Lynn, daughter of George Lynn, of Lockport, Ill. Three children, P. O. address, Swarthmore, Delaware county, Pa.

ABRAHAM BEEKMAN COX, JR., A. M., C. E., (Cherry Valley, N. Y.), son of Abraham Beekman and Levantia White (Livingston) Cox, was born in New York city, April 16th, 1844. Attended public schools, and entered Yale College as freshman in the fall of 1860, graduating in July, 1864, and in September of that year entered the Institute, Division C. In the spring of 1868. acted as rodman on the preliminary survey of the road since built from Cobleskill to Cherry Valley. The road was located in the fall of that year, on which and the construction of the same he was employed until February, 1870. April, 1870, employed as second assistant on the construction of the bridge over the Hudson at Albany. Late in the fall of 1871 this bridge was completed, and Mr. Charles Hilton, its chief engineer, engaged him in drafting rivetted lattice bridges, and in the spring of 1872 put him in charge of the rebuilding of the upper bridge at Albany; was occupied here until April, 1873. On the 30th of that month he married Augusta McBlair Ten Eyck, daughter of Hon. J. C. Ten Eyck, of Mount Holly, N. J., and started immediately for Europe. Returned in November, 1873, and took charge of the Leighton bridge and iron works, at Rochester, N. Y., and designed many of the bridges built there. February, 1876, his father died, and on March 28th his wife. He returned to Cherry Valley, and since then has done no engineering work. Two children. P. O. address, Cherry Valley, N. Y.

JOSE ESCOBAR, C. E., was born in Trinidad, Cuba, July 31st, 1845. On graduation, returned to Cuba, and died soon afterward.

SAMUEL JAMES FIELDS, C. E., (Buffalo, N. Y.,) son of Samuel H. and Mary J. (Fessenden) Fields, was born in Buffalo, N. Y., August 10th, 1844. Prepared by Rev. Mr. McGonegal, and entered the Institute September, 1862. Was from August to October, 1867, in resident engineer's office, New York Central railroad, Syracuse, N. Y.; October, 1867, to December, 1868, assistant engineer location and construction of Southern Central rail-

road, (a railroad running from Oswego to Fairhaven, N. Y.); February, 1869, to June, 1873, assistant, and afterward bridge engineer New York Central and Hudson River railroad; June, 1873, to present time, engineer Niagara Bridge Works, Buffalo, N. Y.; February, 1869, to June, 1873, in charge of location and construction of Junction railroad, a terminal connecting road around the city of Buffalo; also had charge of construction of buildings, coal trestles and freight yards, East Buffalo, and the water supply at different points on the road. Designed nearly all the iron and wooden bridges built during this time. Since January, 1873, has designed and superintended the construction of a large variety of bridges, roofs, viaducts, and other iron structures. Member of American Society of Civil Engineers. Married, October 14th, 1869, C. Elizabeth Kellogg, daughter of Hon. Martin R. Kellogg. Five children; four living.

He left the Institute June 16th, 1863, for three months' service with the Seventy-fourth regiment N. Y. S. N. G., of which he was at that time a member; arrived at the front in time to see the last part of the battle of Gettysburg, and afterward to take part in quelling the New York riots. Through another enlistment, did not attend the Institute during the scholastic year 1864–65.

P. O. address, 562 Ellicott street, Buffalo, N. Y.

MAX LAZARUS GOLDSTEIN, C. E., was born in New York city, November 16th, 1846. Has not followed his profession. Coal merchant, 403 East Fifty-first street, New York city.

CARLOS GUERRERO, B. S., C. E., son of Ciriaco and Juana (Bombalier) Guerrero, was born in Havana, Cuba, March 22d, 1884. Prepared at Havana Royal University, and Salvador College, of Havana, entering the Institute in September, 1864. Chief Engineer of the Havana & Marianao railroad, 1868; asslstant engineer to engineer corps under Gen. Gilmore in Charleston harbor improvements, and in the Savannah & St. John rivers improvements in 1870–71; chief engineer of the Caibarien & Santo Espirito railroad, Cuba, from 1873 to 1879; superintendent and general manager and chief engineer of Zaza railroad, in Caibarien (Cuba) from 1879 to r883, and since 1883 general manager and chief engineer of the Caibarien and Santa

Espirito railroad, and the Zaza railroad, Caibarien ; professor of mathematics, Salvador, San Francisco and Educacion en Familia Colleges, in Havana, Cuba, in 1862–63–72; designed and built Manacas bridge of the Caibarien & Santo Espirito railroad, (152 foot span, iron), branch of four miles on Zaza railroad, Hacha iron bridge of Zaza railroad, and branch of two miles of the Caibarien & Santo Espirito railroad. Received the degree of B. S. from the Havana Royal University. Married, February 9th, 1872, Jacinta Quintero, daughter of Mateo J. Quintero. Six children. P. O. address, Administrador del Ferro-Carril, Caibarien, Island of Cuba.

ALBERT METCALF HARPER, C. E., son of John and Lydia Electa (Metcalf) Harper, was born in Pittsburgh, Allegheny county, Penn., April 22d, 1843. Prepared at the Western University of Pennsylvania, and entered the Institute in September, 1861. August 25th, 1862, appointed by Governor Curtin first adjutant of the One Hundred and Thirty-ninth regiment of Pennsylvania volunteers. He participated in the various battles of the army of the Potomac, and was severely wounded in the "Battle of the Wilderness," May 5th, 1864; was honorably discharged from the state's service, for promotion, September 4th, 1864; appointed by the President an assistant adjutant general of United States volunteers, with the rank of captain, by and with the consent of the Senate, August 17th, 1864; the President conferred on him the rank of major, by brevet, for faithful and meritorious services, May 21st, 1865. At his own request, the war being then over, he was honorably mustered out of the service of the United States, June 27th, 1865. In September, 1865, he returned to the Institute, and recommenced his scientific studies. After graduation he devoted nearly a year to the further study of analytical chemistry. Afterwards he assumed the management of a large oil refinery. In October, 1869, he entered into mercantile business, as a partner in the firm of Dilworth, Harper & Co. After an illness of five weeks, he died of typhoid fever, at the residence of his parents, on the evening of the 10th of December, 1871. At a meeting of the officers and members of his old regiment, held December 12th, they passed resolutions to mark their profound love for the memory of their deceased comrade, expressing sorrow at his untimely

death, and testifying to the brave and soldierly qualities which were their admiration. They spoke of him as one "who through many scenes of an active service in the field bore himself as an intrepid soldier, an ardent and zealous patriot, a gentleman in the truest sense of the word, always exemplifying the traits of morality and religion which mark the perfect man."

FRANK JAMES HEARNE, C. E., (Hannibal, Mo.,) son of William Louder and Maria E. (Ross) Hearne, was born in Cambridge, Dorchester county, Md., September 21st, 1846. Attended Paul Wing's Academy, Sandwich, Mass., part of 1862; Freeland Academy, Perkiomen Bridge, Pa., the remainder of the year; Brooklyn Polytechhic Institute, Brooklyn, N. Y., first half of 1863; University of the City of New York, September, 1863; and entered the Institute in February, 1865. From July, 1867, to May, 1872, was principal assistant engineer on the Hannibal & St. Joseph railroad, Hannibal, Mo.; May, 1872, assistant manager of the blast furnace department of Riverside Iron Works, Wheeling, W. Va.; January, 1873, was promoted to be manager of the same; January, 1874, promoted to be assistant general manager of all departments of the Riverside Works; January, 1875, promoted to be general manager of the same, and so continues to date. As General Manager of the Riverside Iron Works he has remodeled and added to the blast furnace, and increased the daily capacity from forty-five tons to one hundred and thirty tons. He built a bar mill, guide mill and small T rail mill, added to the forge department new machinery, etc., and increased the puddling furnaces from twenty to forty-two; also increased the the heating furnaces from six to nine. He built a nail factory containing fifty-four nail machines, rebuilt the plate mill and one nail factory after a fire in 1876. During 1880 he built a standard gauge railroad of eight miles, and opened and operated an iron ore mine in Dent county, Mo. In 1884 erected a Bessemer steel plant, with a pair of five ton converters, and a blooming mill. Member of the American Institute of Mining Engineers. Married, December 21st, 1869, Lillie Lee, daughter of Warren Lee, of Omaha. Neb. Two children; one living. P. O. address, Wheeling, W. Va.

JOSE HERNANDEZ, C. E., son of Jose de J. and Margarita (Suarez-Macias) Hernandez, was born in Caimito de Hoyo Colorado,

Island of Cuba, September 16th, 1844. Prepared at College Hill, Poughkeepsie, N. Y., and entered the Institute in September, 1863. September, 1867, principal assistant engineer Western railroad of Cuba; engaged in business in New York city the latter part of 1868; practiced in Jersey City, N. J., during 1869; civil engineer in New Brunswick, N. J., 1870 to 1876; engaged in 1877 as civil engineer to municipality of San Antonio de la Banos, Cuba; during 1878–82 in charge of Espana estate in the jurisdiction of Colon, and at the same time had charge of the Zaza railroad, and the laying out and building of its branch to Altamira. In 1882, prostrated by sickness caused by overwork, was obliged to leave Cuba for a colder climate. Married, March 18th, 1868, Catharine Ann Schenck, daughter of William Van Buren Schenck. Three children. P. O. address, 419 Quincy street, Brooklyn, N. Y.

CHARLES EDWARD ILLSLEY, A. M., C. E. *See Instructors, page 170.*

ERNESTO L. LUACES, A. B., C. E., was born in Puerto Principe, Cuba, August 4th, 1844. Chief Engineer of the Santa Marta railroad, Santa Marta, Colombia, S. A.

GEORGE BENJAMIN MALLORY, C. E., son of George W. and Ann K. (Tift) Mallory, was born at Mystic, New London, Conn., September 13th; 1847. Prepared for the Institute at the private school of Palmer Gallup, at Mystic, and entered September, 1863. From April 9th, 1869, to August 1st, 1871, first assistant engineer Maxwell, Grant & Co., Macon, Ga., stationed at Alabama river bridge, Montgomery & Selma railroad; October, 1871, to July, 1873, draughtsman for John Roach & Sons, Chester, Pa.; July, 1873, to July, 1877, principal assistant to W. B. Reaney, engineer and naval architect, Philadelphia; October, 1877, to date, engineer and naval architect in New York, consulting engineer. Member of Institution of Mechanical Engineers, London, England; American Society of Civil Engineers, and American Society of Mechanical Engineers. Married, December 5th, 1883, Lydia Harper, daughter of John Harper, of Pittsburgh, Pa. One child. Wife died October 4th, 1884. P. O. address, 55 Broadway, N. Y.

THOMAS FRANCIS MARSHALL, A. M., C. E., son of Thomas and Eleanor (Ellis) Marshall, was born at Pittsburgh, Allegheny county, Pa., June 27th, 1846. Graduated at the Western University of Pennsylvania, Pittsburgh, Pa., class of 1864, and immediately engaged in the preliminary surveys of the Allegheny Valley railroad. Entered the Institute in September, 1865. In 1868 and 1869 on St. Louis, Iron Mountain and Southern railroad, also Chillicothe & Des Moines City railroad ; 1867 to 1872, Rockford, Rock Island & St. Louis railroad; April, 1872, to December, 1881, engineer for Sweet & Young, contracting engineers, New York, and as such engaged on Union Pacific railroad, New York, West Shore & Buffalo railroad, New York, Susquehanna & Western railroad, Texas Western railroad, Pittsburgh Southern railroad, etc., and general contracting and engineering work; purchasing agent Rockford, Rock Island & St. Louis railroad, July, 1871, to April, 1872, when he resigned to become engineer to Sweet & Young. Received degree of A. B. from the Western University of Pennsylvania in 1864, and of A. M. from the same institution in 1867. Member of the Rensselaer Society of Engineers. Married, November 13th, 1871, to Arianna R. Riddle, of Allegheny, Pa., daughter of George R. Riddle. One child. P. O. address, 166 Ninth avenue, Allegheny, Pa.

AUGUSTE HENRI ALBERT MILLET, C. E., son of Emile and Anne Marie (Huelche) Millet, was born in Paris, France, September 10th, 1847. Prepared at Lespinasse Institute, Fort Washington and Lycée Bonaparte, Paris. Entered the Institute in September, 1864. July, 1867, New York & Harlem railroad, Whitehall & Plattsburgh railroad, St. Louis water works, Chilicothe & Des Moines railroad, Illinois & Mississippi canal; engineer to the government of Ecuador, from 1871 to 1877; engineer and contractor in Guayaquil, Ecuador, from 1871 to 1882; chief of technical bureau, Panama canal, February, 1882, to October, 1882; chief of section at Culebra, (Panama canal), October, 1882, to May, 1883; since July, 1883, engineer for contractors, Panama canal; designed or built the Southern railroad of Ecuador, the custom house of Ecuador at Guayaqnil, the water works of Guayaquil, and many other public works, as well as constructions of all kinds, excavating contracts, etc., on the Isthmus of

Panama. Member of the Rensselaer Society of Engineers, of which he was a founder. Married, September 6th, 1874, Evelina Stagg, of Quito, Ecuador, daughter of General Stagg. Four children. P. O. address, Box 38, Panama, C. A.

FRANK LEDLIE MOORE, C. E., son of Jared Lane and E. Hannah (Dominick) Moore, was born in New York city, April 10th, 1846. Prepared in private schools in New York, notably that of Dr. McElligott, and entered the Institute in September, 1863. May, 1866, on surveys for the "Bound Brook Route," and subsequently on the Connecticut Western & Dutchess & Columbia railroad. His eyesight becoming impaired in December, 1869, he was forced to retire. From 1872 to 1880, he engaged in occasional architectural work, chiefly in Denver, Col. The buildings include one which for a considerable time was the State House of Colorado. Since 1880 private labratory work, chiefly electrical, has been his occupation. Member of "Vassar Brothers" Institute, New York Electrical Society, and the American Institute. Married, April 25th, 1878, Caroline Frances Belcher. Three children. P. O. address, 30 Hooker avenue, Poughkeepsie, N. Y.

CHARLES HORACE MOSS, C. E., son of Horace Orlando and Emeline Betsey (Knap) Moss., was born in New Berlin, Chenango county, N. Y., December 15th, 1844. Prepared at Walnut Hill School, Geneva, N. Y., and at New Berlin Academy; entered the Institute September, 1864. Began the practice of his profession in the summer of 1867 on the Atchison & Pike's Peak railroad; fall of same year was on Perkiomen branch of the Philadelphia & Reading railroad, remaining until the fall of 1868; engaged on the New York & Oswego Midland railroad until the spring of 1870, when he took a position on the Michigan & Lake Shore railroad, which he resigned on account of ill-health. In the fall of 1871 he became engaged in iron ore mining, and later in the manufacture of pig iron also; continued until 1875, when he engaged in the banking business at Sandusky, O., which he still continues. Married, November 25th, 1873, Elizabeth Griswold Lane, daughter of Hon. William G. Lane, Judge Common Pleas, Ohio. Two children. P. O. address, Sandusky, Ohio.

CHAUNCEY VALLETTE PETTIBONE, C. E., son of Chauncey J. and Caroline Eunice (Peabody) Pettibone, was born at Fremont, Sandusky county, O., July 19th, 1845. Prepared at Phillips Academy, Andover, Mass., and entered the Institute December, 1863. Has been a dry goods merchant since 1867, at Fond du Lac, Wis. Married, October 12th, 1870, Maria Corrinne Gillet, daughter of James Monroe Gillet. Five children. P. O. address, Fond du Lac, Wis.

JOHN SALTAR, JR., C. E., son of John and Helen (Gilmore) Saltar, was born in Hancock county, Ill., August 20th, 1845. Prepared at Burlington College, Burlington, N. J., and entered the Institute January, 1864. At Crown Point. N. Y., on Plattsburgh railroad, November, 1867, for eighteen months. Since then has continuously engaged in some branch of the profession, either civil or mechanical, until May, 1883, when he assumed the duties of western manager for the Philadelphia firm of Schleicher, Schumm & Co., engineers, and builders of the Otto gas engine. At present engineer of North Chicago iron and steel company. Member Western Society of Civil Engineers. Married, September 15th, 1870, S. P. Coleman, daughter of Dr. J. P. Coleman ; one child ; wife died December 4th, 1874. P. O. address, 214 Randolph street, Chicago, Ill.

POMPEYO SARIOL, C. E., was born at Puerto Principe, Cuba, July 30th, 1842. Entered the Institute in October, 1864. Attached to engineer department of the New York & Oswego Midland railroad, 1868 ; sailed to Cuba and joined the patriot army; left the army, and was in 1871 on the Western railroad of Havana, where he remained until 1873; has opened an office at Cordoba, Mexico, practicing his profession of civil engineer. Married in April, 1871. Two children. P. O. address, Cordoba, Mexico.

FRANCIS HOFFMAN SAYLOR, A. M., C. E., son of Henry and Mary A. (Mills) Saylor, was born in Schuylkill Haven, Schuylkill, Pa., October 24th, 1844. Prepared at Union Seminary, New Berlin, Pa., and Amherst College, Mass., entering the Institute in 1865. Entered upon the work of his profession in July, 1867. One month on surveys of Lizard Creek railroad, Pennsylvania; April, 1868, assistant engineer Philadelphia & Reading

railroad, two and one half years; September, 1870, chief engineer Northeast Pennsylvania railroad; 1874, chief engineer Delaware & Bound Brook railroad, and engineer in charge of the Delaware river branch of the Northern Pennsylvania railroad during the construction of the "Bound Brook Route," two years; May, 1876, general manager New York & Philadelphia new line, the Bound Brook route, one and one half years; September, 1877, chief engineer of construction Pittsburgh & Lake Erie railroad, until its completion in February, 1879; during part of the above time and ever since, member of the firm of Cofrode & Saylor, civil engineers and bridge builders, and proprietors of the Philadelphia bridge works, at Pottstown, Pa. Under his direction was built the Northeast Pennsylvania railroad, Delaware River branch of the Northern Pennsylvania railroad, Delaware & Bound Brook railroad, and Pittsburgh and Lake Erie railroad; also many railroad bridges throughout the country. Received the degree of A. B. and A. M. from Amherst college, where he graduated in 1865. Married, February 17th, 1874, Rebecca H. Moore, daughter of Dr. Charles Moore, of Pottstown, Pa. Three children. P. O. address, 267 South Fourth street, Philadelphia, Pa.

MILO AUGUSTUS SMITH, C. E., (Detroit, Mich.,) was born in Newark, O., October 24th, 1844. For some years after graduation was a manufacturer in Detroit. About 1880 he went to Denver, Colorado, and engaged in the real estate business. For the past two or three years has been engaged in stock raising in New Mexico and Arizona—most of the time recently in the latter. Was married soon after graduation to Henrietta Dauchy, daughter of Charles Dauchy, of Troy, N. Y. P. O. address, Denver, Col.

WILLIAM BOSTWICK STILSON, C. E., son of S. Jay and Phebe R. (Moore) Stilson, was born at New Milford, Litchfield county, Conn., September 30th, 1847. Prepared at Adelphi Institute, New Milford, and entered the Institute November, 1863. April, 1868, was rodman on Rondout & Oswego railroad, Rondout, N. Y.; October, 1868, to January, 1870, transitman New York & Oswego Midland railroad, Oswego; in 1870, assistant engineer on same road; maintenance of way, Oswego; 1871, principal assistant Schuylerville & Upper Hudson railroad, Stillwater;

1872, assistant New York & Oswego Midland railroad, Beaverkill Point, N. Y.; 1873–75, assistant engineer Erie railroad, Port Jervis, N. Y.; 1875–76, general engineering work, New Milford, Conn.; 1877–8, division engineer Pittsburg & Lake Erie railroad, Shonstown, Pa.; 1876, assistant engineer, machinery department, New York, Lake Erie & Western railroad, Port Jervis, N. Y.; 1880, division engineer Shenandoah railroad, Waynesboro, Va.; 1881, division engineer New York Susquehanna & Western railroad, Hollisterville, Pa.; 1882, engineer machinery department Michigan Central railroad, Jackson, Mich.; 1883–85, assistant engineer, same road, Detroit, Mich. Married, August, 1869, Ida C. Alvord, daughter of J. M. Alvord, of Oswego, N. Y. Four children. P. O. address, 125 Lincoln Avenue, Detroit, Mich.

CYRUS RICHARD STONE, C. E., was born in De Kalb, N. Y., March 26th, 1840. Assistant engineer on the Lake Superior & Mississippi River railroad. P. O. address, Hinckley, Minn.

CLASS OF 1868.

JOHN JOSEPH ALBRIGHT, M. E., (Scranton, Pa.,) son of Joseph Jacob and Elizabeth (Sellers) Albright, was born at Ætna Furnace, Rockbridge county, Va., January 18th, 1848. Prepared at Williston Seminary, East Hampton, Mass., and entered the Institute in the fall of 1864. Was engaged in the wholesale coal business in Harrisburgh, Pa., from May, 1871, until May, 1872. then, in the same business at Lewiston, Pa., until April, 1873, and in Washington, D. C., from September, 1873 until June, 1883, when he removed to Buffalo, N. Y., and is now engaged in the same business in the south and west, with headquarters at Buffalo. Married, December 4th, 1872, Harriet M. Landon, daughter of J. Le Droit Langdon. Three children. P. O. address, Buffalo, N. Y.

THOMAS APPLETON, C. E., son of Edward and Frances A. Appleton, was born at Reading, Middlesex county, Mass, October 1st, 1846. Prepared at Reading High School. Had two years practice as rodman and assistant engineer on the Boston, Hartford & Erie railroad before entering the Institute, in 1865. In 1862 he commenced as rodman on the Boston, Hartford &

Erie railroad, and continued upon that road, his father being chief engineer, until June, 1864, when he enlisted in the Eighth Massachusetts regiment for one hundred days' service. After the expiration of his term of enlistment he entered the Institute. During each summer vacation he was engaged in railroad surveying. After graduating was appointed resident engineer on the Dexter & Newport railroad in Maine; after completing that road, in November, 1868, he became assistant engineer on the Somerset railroad, in Maine; in June, 1869, was engaged in railroad surveying in Massachusetts; in 1871, built the Essex branch railroad in Massachusetts, as chief engineer; in 1871, chief engineer Marginal Freight railroad, Boston, and principal assistant engineer Boston & Maine railroad, where he remained two years; in 1870, principal assistant engineer Northampton & Massachusetts and Troy & Greenfield railroads, in Massachusetts; from 1872 to 1878, engaged in railroad surveying in New England states, and acted as agent of the Niagara bridge works; in 1878 opened an office in Dover, N. H., where he carried on a general engineering business for two years; in 1880–81, superintendent of bridges and buildings in Galveston, Harrisburg and San Antonio railroad in Texas; in 1881–82–83, chief engineer of the Leavenworth, Topeka & Southwestern, and Topeka, Salina & Western railroads, in Kansas; 1884, engineer and contractor for public works, Kansas City, Mo.; 1885, city engineer, East Saginaw, Mich. Member of the Boston Society of Civil Engineers. Married, October 1st, 1871, Mary Louise Hovey. P. O. address, East Saginaw, Mich.

Jose Joaquim Alves de Barcellos, B. S., C. E., G. E., son of Fidelis Jose Alves and D. Anna Jose (de Souto-Mayor) de Barcellos, was born at Cidade de Campos, Municipio de Campos, Province of Rio de Janeiro, Brazil, December 12th, 1844. Before entering the Institute, he graduated at the late Central School of Rio de Janeiro, and before that at the Institute of New Friburg, directed by John Henry Freese. Entered the Institute in 1866. From July, 1868, to April, 1869, was employed as assistant engineer at Brooklyn Central Park, and after that on a railroad survey at Crown Point, N. Y. Returned to Brazil in 1869, and was appointed chief engineer of the Campos & Macahe canal (80 miles long), and served as such from August, 1869, to August,

1872. In 1874 bought a sugar cane plantation, and lived as a *farendeiro* until 1882, when he was made superintendent and engineer of the Uzina Barcellos modern sugar factory, belonging to a company at S. Joao da Barra, remaining until May, 1884. Is director and technical engineer of the Engenho Central of Suissama, the largest sugar factory of Brazil. Designed and constructed a branch of the Campos & Macahe canal; made designs, estimates, &c., for a projected large sugar factory for the Companhia Agricola, at St. Joao da Barra, Rio de Janeiro. Received the degree of Bachelor of Physical and Mathematical Sciences, December, 1865, and graduated as Geographical Engineer, February, 1866, at the Polytechnic School of Rio de Janeiro. Married, November 21st, 1869, D. Anna da Conceicao Alves de Barallos, daughter of Domingos Alves de Barcellos. Twelve children; six living. P. O. address, Campos, Brazil.

STEPHEN WILLARD BARKER, M. E., son of Stephen and Lydia (Wood) Barker, was born in White Creek, Washington county, N. Y., April 14th, 1848. Prepared in Redfield and Bernard French school, New York city, and entered the Institute in September, 1865. Engaged in the wool business and woolen manufacturing. He was elected Trustee of the Institute in June, 1886, after the printing of this volume was begun. Married, April 20th, 1881, Frances Southwick Tillinghast, daughter of Charles W. Tillinghast, of Troy, N. Y. One child. P. O. address, Troy, N. Y.

VIRGIL GAY BOGUE, C. E., son of George C. and Mary (Perry) Bogue, was born at Norfolk, St. Lawrence county, N. Y, July 20th, 1846. Attended Canton, St. Lawrence county, schools, the Academy, and Gen. Russell's military school, at New Haven, Conn. Entered the Institute in the fall of 1864. Entered upon the work of his profession in the fall of 1868, on Prospect park, Brooklyn, N. Y.; November 20th, 1869, sailed for Peru, S. A., under a four months' contract with a Peruvian company to make surveys; at the close of this contract, entered the employ of Henry Meiggs; first work under him was preliminary survey and estimates on a projected railroad from Tacuo, Peru, to the Bolivian frontier; this work lasted several months; about June, 1870, was appointed assistant engineer on the Callao, Lima &

Oroya railroad, and employed on location and construction for about a year, when he received the appointment of division engineer, in which capacity he served until early in 1874; during parts of 1874–75 he was employed as contractor on the same road; February, 1876, returned to New York; May, 1877, returned to Peru; made definite location of railroad from Oroya to Cerro de Pasco, Peru; from October, 1878, to September, 1879, was superintendent of the Trujillo railways, with headquarters at Trujillo, Peru; November, 1879, sailed for San Francisco. In March, 1880, was appointed assistant engineer Union Pacific railroad; made explorations and surveys in Cascade mountains of Washington Territory, for a route connecting Tacoma, on Puget's Sound, with the main line of the Union Pacific railroad, near rhe mouth of Snake river; also explored part of the Cœur d'Alene mountain with a view of finding a direct route from Spokane Falls to the mouth of Bitter Root river. In June, 1882, appointed principal assistant engineer on the Western Division Union Pacific railroad; had charge of locating and building branch from Tacoma toward Seattle, W. T., of Portland division; of location of Cascade division, and construction of same so far as it has been built to this date. He built the Tacoma coal bunkers; also Kaloma temporary transfer, and at present time has general charge of surveys and construction work on Western Division Union Pacific railroad, with headquarters at Portland, Oregon. Elected member of American Society of Civil Engineers in 1869. Married, March 1st, 1872, Sybil E. Russell, daughter of John L. Russell. Two children. P. O. address, Portland, Oregon.

Roswell Emmons Briggs, C. E., son of George A. and Sarah A. (Stilson) Briggs, was born at New Bedford, Bristol county, Mass., October 11th, 1846. Prepared at New Bedford High School; was for two years on engineering work, in office and field, and entered the Institute September, 1864. July, 1868, was assistant engineer New Bedford Water Works; from July, 1870, to April, 1873, assistant engineer Callao, Lima & Oroya railroad, Peru, S. A.; 1873–80, engaged in general engineering; October, 1880, to 1886, on Mexican Central railroad; from April, 1882, to July, 1884, chief engineer Mexico Division; from July 1st, 1884, chief engineer Mexiean Central railroad; 1886, civil

engineer, New Bedford, Mass. Member American Society Civil Engineers. Married, June 3d, 1869, Harriet L. Allen. Six children. P. O. address, New Bedford, Mass.

LEFFERT LEFFERTS BUCK, C. E., son of Lemuel and Elizabeth (Baldridge) Buck, was born in Canton, St. Lawrence county, N. Y., February 5th, 1837. Prepared at St. Lawrence University, Canton, N. Y., and entered the Institute September, 1865, in Division C. Engaged during summer vacations 1866–67, as transitman S. & O. railroad, through the Adirondacks. September, 1868, was engaged making surveys for reservoir at headwaters of Grass River, St. Lawrence county; November 2d, 1868, assistant engineer New York sewer department, until March, 1871, when he went to Peru, S. A., on location of a line of railroad ; April, 1872, had charge of the erection of Verrugas viaduct on Lima & Oroya railroad, and designed method of erection ; 1873, inspected materials for bridge across the Mississippi river at Louisiana, Mo.; 1875, erected several bridges in Peru, S. A.; 1877–8, reinforced the anchorage of Niagara railroad suspension bridge, and prepared plans for sinking the pumping well of Erie basin dry docks, Brooklyn ; 1879–80, designed and executed renewal of suspended superstructure of Niagara railroad suspension bridge ; 1881–82, resident engineer of Central railroad of New Jersey; 1883, engineer Willamette river bridge, Portland, Ore.; January 1st, 1884, formed present copartnership with G. W. McNulty. Worked five years as machinist, for the purpose of practice, commencing March 19th, 1855. Located and built Lake Hopatcong railroad, for Central railroad of New Jersey. Elected member American Society of Civil Engineers in 1874. Wrote report on renewal of Niagara suspension bridge, 1880 ; published 1881. Wrote a paper on the same for the American Society of Civil Engineers, which was read before their convention, 1882, at Montreal, for which he received the Norman medal. P. O. address, 53 Broadway, New York city.

JOSEPH HIRAM CAMPBELL, M. E., (Ironton, O.,) son of Hiram and Sarah E. (Woodrow) Campbell, was born at Mount Vernon Furnace, Lawrence county, O., March 6th, 1848. Prepared at Ironton public schools, and Pennsylvania military academy,

West Chester, Pa., entering the Institute September, 1864. Since the summer of 1868 has been engaged in the manufacture of pig iron at Ironton, O. Built "Sarah" furnace, Ironton, O. Member of the board of examiners of public schools, Ironton, O. Married, April 18th, 1872, Mary C. Norton, daughter of Col. E. M. Norton, of Ironton, O. Two children. Wife died May 10th, 1883. P. O. address, Ironton, Lawrence county, O.

GASPAR FERNANDO DE CEBALLOS, C. E., son of Gaspar M. and Rosa del Rio de Ceballos, was barn at Remedios, Cuba, August 14th, 1844. Prepared at private colleges in Havana, and also attended for three years preparatory school for surveyors, architects, &c. Entered the Institute in 1865. Since September, 1872, has been professor of mechanics, English language and drawing at the Instituto Veracruzano, an institution where five years of study is required, and is equivalent to the studies for degree of B. S. Has also worked as land surveyor, and been employed for four years in writing the English and French correspondence in two commercial houses in Vera Cruz. Worked for a short time on hydrographical survey for the improvement of Vera Cruz harbor; also as a journalist. Was made a member of the Academy of Professors of Vera Cruz, and acted for two years as secretary to the board of trustees of the institute. Has written a treatise on geometrical drawing, including all plane curves and developments of regular bodies; also a treatise on geometry and trigonometry (plane). P O. address, Botica "La Merced," Vera Cruz, Mexico.

MORDECAI THOMAS ENDICOTT, C. E., son of Thomas Doughty and Ann (Pennington) Endicott, was born at May's Landing, Atlantic county, N. J., November 20th, 1844. Prepared by private study, and entered the Institute February, 1865. His first professional engagement was as assistant in the office of R. P. Rothwell, civil and mining engineer at Wilkesbarre, Pa., from July to December, 1868; rodman in civil engineer's department of United States navy yard, Brocklyn, N. Y., May, 1869, to January, 1870; draughtsman in office of New Haven, Middletown & Willimantic R. R., New York city, January, 1870; May, 1870, was detailed to the field as assistant on Connecticut river bridge at Middletown, Conn., on same road; assistant engineer in charge of the Dresden extension of the Cincinnati & Muskingum Val-

ley railroad, November, 1870, to January, 1872, at completion of work; assistant civil engineer at League Island naval station, Philadelphia, Pa., February, 1872, and was transferred, October, 1872, to assistant civil engineer in charge of department of yards and docks at United States navy yard, Philadelphia, Pa.; while in the performance of this duty was commissioned as a civil engineer in the United States navy from date of July, 1874, detached from duty in this yard, July 16th, 1874, and ordered to navy yard at New London, Conn., as civil engineer in charge of department of yards and docks; July, 1879, ordered to navy yard at Portsmouth, N. H., in same capacity; July, 1881, ordered to navy yard at League Island, Philadelphia, Pa., in the same capacity, where he is now on duty. Member of Franklin Institute and American Society of Civil Engineers. Married, May 29th, 1872, Elizabeth Adams, daughter of George W. Adams, of Dresden, O. Six children. P. O. address, United States Navy Yard, League Island, Philadelphia, Pa.

FRANCIS FISHER FAY, M. E., (Troy, N. Y.,) was born in Flora Falls, N. Y., May 4th, 1846. After graduation, he went to Colorado, where he followed his profession of mining engineering very successfully, until he was prostrated by sickness. He started for home, but at Chicago was lost sight of, and so far as known has never been heard from.

GEORGE THOMAS HALL, C. E., son of Rensselaer S. and Maria E. (Emigh) Hall, was born in Ballston, Saratoga county, N. Y., April 6th, 1845. He attended the Normal School, Albany, N. Y., and then prepared himself and entered the Institute, Sophomore Class of 1866. His first work was as transitman on the Air Line railroad, built from Boston to New Haven. Was there about two years, and the latter part of the time, in 1868, had charge of the constructing of all bridges on that line. He then went to Canada, and was engaged in the construction of 180 miles of the North Shore railroad. This enterprise being abandoned, he took the position of chief engineer of the Eastern Division West Shore railroad. He was next engaged in New York city, making the first surveys for the Gilbert elevated railroad, and afterward appointed State division engineer on the Champlain canal enlargement, and located at Whitehall, N. Y., where he remained for three years. From here he returned to

New York, as division engineer of the Second Avenue Elevated railroad, which was entirely constructed by him in 1881. He also had charge of the foundation work on the Eighth and Ninth Avenue lines. Notary public and commissioner of deeds, Woodside, N. J., 1869. Member of the American Society of Civil Engineers. In 1881 he wrote a pamphlet upon "Elevated Railways and their Construction," with particular reference to the Second Avenue railroad in New York city. Married, December 29th, 1869, Minnie E. Post, daughter of J. Wilson Post, of Brooklyn, N. Y. He died June 2d, 1881.

BENJAMIN ROMAINE LAWRANCE, B. S., (New York City,) son of Horatio Ireland and Mary Louise (Romaine) Lawrance, was born in Marshall, Calhoun county, Michigan, May 10th, 1846. He resided in New York city previous to entering the Institute in September, 1864. Has been engaged as a merchant, banker, and in care of real estate. Married, November 15th, 1871, Marie R. O. Elliott, daughter of Andrew Foster Elliott, New Orleans, La. Six children. P. O. address, Rochester, N. Y.

ALTER MEGEAR, C. E., (Wilmington, Del.,) son of Thomas L. and Mary C. (Alter) Megear, was born in Philadelphia, Pa., October 23d, 1847, and entered the Institute in September, 1864. He entered upon the work of his profession in October, 1868, in Edgemoor Iron Works, near Wilmington, Del., remaining until July, 1878, since which time he has not practiced engineering. Member of the Engineers' Club, of Philadelphia, Pa. Married, October 28th, 1880, Elizabeth T. Betts, daughter of Edward Betts, of Wilmington, Del. One child. P. O. address, 3,306 Arch street, Philadelphia, Pa.

WILLIAM W. MILLS, C. E., son of Abiel B. and Ann (Warford) Mills, was born in New York city May 1st, 1846. He prepared at N. A. Lespinasse's French Institute, Fort Washington, New York city, and entered the Institute in the fall of 1865, graduating in the spring of 1868. Practiced city surveying in New York city, to a small extent, in connection with other business. Draughtsman and assistant surveyor in office of city engineer, Oakland, Cal., during the winter of 1879. He returned to New York city in March, 1879, to take charge of business and real estate left by decease of father. Was appointed a city surveyor

by the New York common council, and sworn in by Mayor Edson April 16th, 1884. Retail hardware merchant, also real estate agent in charge of properties. One of the original members of the Rensselaer Society of Engineers, Troy, N. Y. Married, May 28th, 1873, Elizabeth P. Corning, daughter of Nathan Corning, of Mentor, Ohio. One child. P. O. address, Station M, New York city,

OTHNIEL FOSTER NICHOLS, C. E., son of Thomas P. and Lydia (Foster) Nichols, was born in Newport, R. I., July 29th, 1845. Prepared for the Institute under Prof. J. C. Fox. Residence before entering, Brooklyn, N. Y. Occupation, machinist 1862–64. Entered the Institute in September, 1865. July, 1868, New York and Brooklyn to 1871; Peru, S. A., 1872–75; 1876–77, New York city; 1878, Rio Madeira, Brazil; 1879–81, Trenton, N. J.; 1882–83, Henderson, Ky. Principal assistant engineer Suburban Rapid Transit Company, New York. Married, November 21st, 1876, Jennie Swazey. Three children. P. O. address, 40 Wall street, New York city.

HARWOOD VERNON OLYPHANT, C. E., (Dobb's Ferry, N. Y.,) son of R. M. and Sophie (Vernon) Olyphant, was born in New York city, July 20th, 1847. Entered the Institute in 1865. Immediately after graduation took the position of superintendent, at Grand Tower, Jackson county, Ill., and afterward general superintendent and general manager of the Grand Tower Mining, Manufacturing and Transportation company, which he held until February, 1874, when he was appointed assistant superintendent of the Delaware & Hudson Canal company. He then moved to Albany, and filled the above position with marked ability, but in the spring of 1875 his health began to suffer from the burden of labor and responsibility which rested upon him. In September, 1875, he sailed for Europe, with his family, and died in London on the morning of October 16th, 1875. His remains were brought to this country, and funeral services were held in the Collegiate Reformed Church, Fifth Avenue and 29th street, New York, on the 10th of November. The services were conducted by the Rev. Dr. Ormiston, pastor of the church, and the address, which was afterwards printed, delivered by the Rev. Thornton M. Niven, Jr., of Dobbs Ferry. Married, De-

cember 8th, 1870, Mary K. Lamport, daughter of John T. Lamport, of Troy, N. Y. One child.

AMBROSE VINCENT POWELL, C. E., son of George W. and Mary (Dunbar) Powell, was born in Laurens, Otsego county, N. Y., May 4th, 1847. Attended the Cooperstown, N. Y., Seminary, and entered the Institute September, 1864. January, 1869, employed as corporation surveyor at Corry, Pa.; 1871, assistant engineer Oil Creek & Allegheny River railroad, Titusville, Pa.; 1871, chief engineer Michigan & Ohio railroad, Grand Haven, Mich.; 1875–77, civil engineer, Battle Creek, Mich.; 1878–79, engineer for receiver, Chicago & Lake Huron railroad, Battle Creek, Mich.; 1880, assistant chief engineer, Chicago & Grand Trunk railroad, Chicago, Ill.; 1881–82, engineer in charge of Chicago & Western Indiana railroad, Chicago; 1883, engineer South Chicago Dock company, Chicago; 1884–85, engineer Calumet & Chicago canal and dock company; 1886, consulting engineer Calumet & Chicogo canal and dock company, and engineer and superintendent of Public Works department, Hyde Park, Ill. Member of Western Society of Engineers, Chicago. Married, December 15th, 1869, Mary Alice Kellogg, daughter of William Hill Kellogg, of Ithaca, N. Y, P. O. address, 170 Dearborn street, Chicago, Ill.

CHARLES RIDGELY SCHOTT, C. E., (Philadelphia, Pa.,) was born in Baltimore, Md., Nouember 11th, 1847. Entered the Institutc September, 1864. After graduation, was immediately, July, 1868, appointed assistant engineer on the Hannibal & St. Joseph railroad, in which position he was engaged on a variety of construction and other work until February, 1869, when he was promoted to the charge of a division including the Quincy bridge across the Mississippi river. In June, 1870, he left this position in consequence of malarial fever, and was engaged as assistant engineer on the Kansas Pacific railroad, in topographical work and construction, until February, 1871, when he was transferred to the charge of the chief engineer's office at Lawrence. Returning to the east shortly after, he was in the employ of the Boston Franklinite company until August, 1871, when he was appointed an assistant engineer in the topographical bureau of the department of public parks, New York city.

During his service in this position, he conducted a very thorough triangulation of the Harlem river and Spuyten Duyvil creek, and was also engaged in the topographical surveys of the territory since annexed to the city of New York. In June, 1874, he was promoted to the position of division engineer, and after December, 1875, was virtually the principal assistant on the work of laying out streets, etc. The gradual advance of pulmonary disease, which was hereditary in his family, compelled him to relinquish active duty in his office in January, 1878, and at length terminated his life on the 9th of July, 1878. In all the positions to which he was assigned, Mr. Schott won the respect and regard of his superiors by his strict attention to his duties, and the more than ordinary intelligence displayed in their performance. These qualities, in addition to the strict integrity of his character, seemed to give promise of his attalning a prominent rank in his profession, when his career was brought to an untimely end by disease. Elected a member of the American Society of Civil Engineers April 1st, 1874; member of the Society of Cincinnati. Married, March 30th, 1872. No children living.

GEORGE STEELE SKILTON, C. E., son of Avery Judd and Mary Augusta (Candee) Skilton, was born in Troy, Rensselaer county, N. Y., November 25th, 1843. He attended the Troy High School until December, 1859, when he was obliged to leave on account of ill health. Went to Savannah, Ga., in 1860. He returned early in 1862 and entered the Amenia Seminary, Amenia, Dutchess county, N. Y., remaining nine months, and was then occupied in commercial business until April, 1865. During June, July and August of 1865, reviewed with assistant professor of mathematics of the Institute, and entered in September, 1865. Engaged on Mexican Railway, 1871–72; City of Mexico contract building, artesian wells, etc., 1873–74; in charge of location, Mexican Central railroad, 1874–76; in charge of draughting office, Kansas City Southern railroad; chief assistant engineer and in charge of construction Mexican Central railroad, 1880–81; February to December, 1882, Mexican Central railroad, first southern division, (Mexico to Leon,) and Guanaxuato branch; mining in the Pachuca district, Mexico, 1883; general superintendent and chief engineer Sinaloa & Durango

railroad, 1884; vice consul-general of the United States in Mexico, 1869–71 and 1873–77. Member of the American Society of Civil Engineers. Married, May 29th, 1880, Adah Gould Sawyer, daughter of Jerome Sawyer. P. O. address, Culiacan, State of Sinaloa, Mexico, Pacific coast. Address in the United States, 139 Bergen street, Brooklyn, N. Y.

THEODORE S. SMITH, JR., C. E., (Flora Falls, N. Y.) After graduation, was assistant engineer on the Jersey City and Albany railroad, Stony Point, N. Y. Deceased.

IRVING ARIEL STEARNS, M. E., (Cold Water, Mich.,) son of George W. and Miranda (Tufts) Stearns, was born in Rushville, Ontario county, N. Y., September 12th, 1845. Prepared at Benedict's Collegiate Institute, Rochester, N. Y., and entered the Institute September, 1864. September, 1868, to October, 1869, was assistant in chemistry and natural science at the Institute; October, 1869, to August, 1871, assistant to R. P. Rothwell, mining and civil engineer, Wilkesbarre, Pa.; August, 1871, to August, 1872, superintendent and engineer McNeal coal and iron company, Schuylkill, Pa.; since that time, mining and civil engineer, Wilkesbarre, Pa. Built railroad and wagon bridge across the Susquehanna river at Shickshinny, Pa.; iron highway bridge across the Susqhehanna river at Pittston, Pa.; Lehigh Valley railroads Tifft Farm improvements at Buffalo, N. Y., and various collieries throughout the anthracite coal region of Pennsylvania. Member of American Institute of Mining Engineers, American Society of Civil Engiueers, Engineers' Club of Philadelphia, and Western Society of Engineers. Married, November 20th, 1872, Clorinda W. Shoemaker, daughter of Hon. L. D. Shoemaker, of Wilkesbarre, Pa. Two children. P. O. address, Wilkesbarre, Pa.

CLASS OF 1869.

TRUMAN HEMINWAY ALDRICH, M. E., (New York city,) son of William F. and Louise M. (Klapp) Aldrich, was born in Palmyra, Wayne county, N. Y., October 17th, 1848. Prepared at the Westchester Military Academy, Pa., and entered the Institute

in 1865. Was engaged in civil engineering in 1870–71, on the Erie railroad and Midland railroad ; also assistant engineer to Essex county public road board of Newark, N. J. Has been engaged in mining and as a mining engineer in Alabama since that time. General manager and engineer for Pratt coal and coke company, Monticello coal company, Southern mining and transportation company, Jefferson coal company, and is now vice-president of Cahaba coal mining company, all of Alabama; partner in a banking house in Selma, Ala., and interested in mines and coke ovens at all the principal centres in Alabama. Member of American Institute of Mlning Engineers, American Society of Civil Engineers, and Cincinnati Society of Natural History. Wrote part of the Alabama State Geological Report for 1878. Married, May 18th, 1871, Anna M. Morrison, of Newark, N. J. Three children. P. O. address, Southern Avenue, Cincinnati, O.

ROBERTO ANZOLA, C. E., was born in Bogota, New Grenada, January 29th, 1849. Civil Engineer, La Palma, New Grenada.

EDWARD WRIGHT ARMS, C. E., son of Seneca and Jane (Wells) Arms, was born in Troy, Rensselaer county, N. Y., December 4th, 1845. Prepared at the Troy High School. He learned the trade of mathematical instrument maker, and was a journeyman at the time of entering the Institute, September 12th, 1866, division C. Was four years with W. & L. E. Gurley previous to entering the Institute, and was with them during his course and since, without interruption. School commissioner city of Troy, one term. Member of the American Association for the Advancement of Science. Published "Archives of Arms Family." Married, January 11th, 1871, Ella S. Wright, daughter of Lucius Wright, of Troy, N. Y. One child. P. O. address, Troy, N. Y.

ROBERT BUNKER COLEMAN BEMENT, C. E., (Staten Island, N. Y.,) son of William and Catherine B. (Lewis) Bement, was born in Northumberland, Saratoga county, N. Y., July 3d, 1848. Entered New York University, New York city, where he remained until the middle of the Sophomore year, at which time, February, 1865, he entered the Institute. In July, 1869, he was appointed assistant engineer of the Burlington & Missouri River railroad, in Nebraska, remaining two and a half years, Lincoln,

Nebraska. Three years chief engineer Dubuque & Minnesota railroad, Chicago, Clinton & Dubuque Railroad, and Iowa Pacific railroad, Dubuque, Iowa; chief engineer Troy & Boston railroad, two years after the completion of the Hoosac tunnel, Troy, N. Y.; manufacturer of steel hammers for two years at Buffalo, N. Y., and merchant and manufacturer in Boston, Mass., May, 1882–86. At present treasurer and general manager of Charleston Water Works, Charleston, Kanawha county, W. Va. Built one hundred and twenty miles of Dubuque and Minnesota railroad and fifteen miles of Chicago, Clinton & Dubuque railroad. Member of Boston Society of Civil Engineers. Married, December 31st, 1872, Mary E. Tracy, daughter of Cornelius Lansing Tracy, of Troy, N. Y. Two children. P. O. address, Charleston, Kanawha county, W. Va.

ALEXANDER MILLER BLACK, C. E., son of George Black, was born in Pittsburgh, Pa., April 3d, 1849. He entered the Institute September 14th, 1865. After graduation he accepted a position with the firm of Fulton, Bolleman & Co., manufacturers of cordage, July 12th, 1869, and remained three month. Was connected with the same house from January 1st, 1870, to March 6th, 1871, then becoming connected with the firm of Lloyd & Black, Kensington Iron Works, but was given no active employment until shortly before his father's death, which occurred in August, 1871, when he occupied his place, so far as the duties pertaining to the iron business were concerned. P. O. address, Allegheny City, Pa.

FREDERICK JOHN BOLLER, C. E., son of Henry John and Anna Margaretta (Pancoast) Boller, was born at Philadelphia, Pa., November 9th, 1847. Prepared at the University of Pennsylvania, and entered the Institute September, 1866. Entered upon the work of his profession December 18th, 1870. Married, June 8th, 1882, Annie Randall, daughter of Heman Mills, of Canajoharie, N. Y. One child. P. O. address, 183 East Ninety-third street, New York city.

HENRY BURDEN, M. E., son of Peter A. and Abbie S. (Shepard) Burden, was born in Troy, Rensselaer county, N. Y., March 1st, 1850. Prepared at Troy Academy, and entered the Institute September, 1865. From August, 1869, until May, 1872, took a

practical course in the machine shop, foundry, and in the puddling and rolling department, at Burden Iron Works, Troy, N. Y.; 1872–79, in charge of the blast furnaces, etc., at the same works. In 1879 took charge of the Albany City iron company's furnaces, Albany, N. Y., and remained there until the fall of 1881. Traveled in Europe for six months in 1874. Member of the American Association for the Advancement of Science, the American Institute of Mining Engineers, and the University Club, New York city. P. O. address, Troy, N. Y.

WILLIAM NATHANIEL BURGESS, M. E., son of William T. and Ophelia R. (Crosby) Burgess, was born in Belvidere, Boone county, Ill., November 30th, 1845. Prepared for the Institute at W. G. Hartshorn's preparatory school, in Chicago, Ill., and entered in the fall of 1865. In 1869 was assistant engineer on the construction of the Vandalia railroad, and has followed railroad construction ever since, as a civil engineer, superintendent for constructors and contractors. P. O. address, city engineer's office, 22 East Missouri Avenue, Kansas City, Mo.

ROBERT FORSYTH, C. E., son of James and Sarah M. (Tibbits) Forsyth, was born in Troy, Rensselaer county, N. Y., September 28th, 1849. Prepared at College Hill school, Poughkeepsie, N. Y., and entered the Institute September, 1865. Began work in July, 1869, as assistant engineer Kohanza water works, Danbury, Conn., remaining three months; entered Bessemer steel works, Troy, N. Y., as a student, in January, 1870, and worked there until November, 1871, when he went to Chicago to take charge of the Bessemer works of the North Chicago Rolling Mill company, and remained as superintendent of the Bessemer department until January, 1883, when he began practice as a consulting engineer at Pittsburgh, Pa. Is at present general superintendent of Union steel company, Chicago, Ill. Started the 10 ton Bessemer plant of the North Chicago rolling mill company. Member of American Institute of Mining Engineers, American Society of Civil Engineers, American Society of Mechanical Engineers, and Iron and Steel Institute of Great Britain. P. O. address, 75 Honore Building, Chicago, Ill.

HENRY G. MCCLELLAN, C. E., was born in Coila, Washington county, N. Y., on August 5th, 1847. His father, William Mc-

Clellan, an esteemed citizen and farmer, established in that locality for a long period, noticing the marked ability and especially the tenacity of purpose and early love of books manifested by his son, decided to give him opportunities for the full play of his talents in the direction in which they seemed to tend, civil engineering. Consequently, after the necessary preparatory course of studies, under Professor Beals, of Cambridge, N. Y., he entered the Institute in September, 1865. He was at once noted among the steady, painstaking and conscientious students, already commanding esteem by his really noble and upright character. Not his, perhaps, the dazzling brilliancy which often conceals a weak judgment, nor that extraordinary facility which often deceives the possessor into an exaggerated estimation of his powers, until the world and the practical tests of life, by rubbing off the varnish of this shallowness, leaves only a sense of disappointment and failure. McClellan's qualities were of the steady kind, and he was well fitted to enter a profession where a well balanced mind and the faculty of exact logical deductions are especially needed to secure success.

His first work was on the Hoosac Tunnel, then one of the great practical schools of engineering. He remained there but a short time, however, and was next engaged on the survey of the town of Morrisania. It is a peculiarity of our engineering life in the States, and perhaps an excellent feature, this often changing from one kind of work to another; from the tunnel, its drills and blasting tools, to the surveyor's transit; from that to the bridge builder's calculations of strains; then to our western railroads, water works for the pioneer cities of an always advancing civilization, etc. It is true that the duties falling within the bounds of civil engineering, becoming, as they do, more and more numerous, force the engineer, as it were, to take up a specialty. But it is only seldom that an American engineer will consent to adopt a certain branch and dedicate his labors to it alone, without having been through many of the stages indicated above.

McClellan's next change of professional work was an important one. His appointment as civil engineer to the government of Ecuador, S. A., in 1870, took him three thousand miles from home to a perfectly strange, new, fascinating country, whose language, customs, politics, and physical and moral aspects were

a subject of wonder and delight to him and his colleague, Mr A. A. Rogers, of Utica, N. Y. Had the national resources, and I may say, the peculiar institutions of this interesting Republic, corresponded to the enthusiastic views of its then President, Gabriel Garcia Moreno, McClellan and his friends would have had onh of the most enticing fields of opportunity in which to build up an honorable, nay, a brilliant career, and to leave, as monuments of their skill, roads and railroads compared with which the tame prototypes in our eastern and even western States would have appeared as mere child's play in the difficulties of both location and construction. Those American engineers who contributed to that brilliant epoch in Peru, during which the stupendous Oroya railroad was built, can no doubt recall their first impression at the sight of the majestic Andes, and their realization of the apparently insurmountable difficulties which only any amount of perseverance, energy, pluck and talent could overcome.

A few recollections of McClellan's life in Ecuador will be permitted, coming from the author of this sketch (A. H. Millet, C. E., class of 1867,) who was one of his personal friends and a colleague during his South American career, which extended up to 1875. He remembers well the high appreciation of Garcia Moreno for this tall American youth, "whose eye was so frank, who at the first glance seemed so reliable, whose word was gold." These were the President's own words. Garcia Moreno was then so wrapt up in projects of roads, railroads, water works, reconstruction of towns (Ibarra and Otavalo had been entirely destroyed by the earthquake of 1868,) that "his engineers," as he called them, were always welcome, never allowed to wait for an audience; and the impatience and pleasure with which the President, interrupting even official business, would unroll plans brought for his inspection, was especially encouraging.

McClellan's first work was a reconnoissance for a road uniting Quito with the coast, through the province of Esmeraldas. He encountered many hardships in this exploration through untrodden tropical forests, crossing swollen torrents, exposed at one time to die of hunger, abandoned at another by his Indians, but always ovərcoming obstacles with that cheerfulness and indomitable will which were characteristic of him. He was next en-

gaged in the survey of New Ibarra and Otavalo (province of Imbabura) ; then in the construction of the Esmeraldas road (of which about seventy miles were built); and finally in the survey and construction of the Southern railroad, designed to unite the carriage road from Quito, of which 160 miles had been completed, with the coast, coming out near Guayaquil. He revisited home and also went to Europe, for the purchase of railroad supplies. It was characteristic of his inborn honesty that when he returned to Ecuador he was actually poorer than when he left it, and that the Government got the benefit of those reductions of prices which very often, not to say usually, find their way into the agent's pocket under the denomination of "commissions." The Sonthern railroad was then begun, and McClellan had already built some twenty miles (1875), when his health gave way and he was obliged to resign, much to the regret of the government officials, and of all his friends. In that memorable year, Garcia Moreno was assassinated on the threshold of his " palacio," in Quito, and the prospects, financial and political, did not seem to indicate a vigorous prosecution of public works. McClellan had, in 1874, married Miss Agnes French, daughter of D. W. French, D. D., of Mercer, Pa., a most estimable lady, who had shared her husband's life in the backwoods of Ecuador, and who became the mother of two children.

Our friend's next residence was in San Francisco, Cal., where for four years he was engineer of the Pacific bridge company, bringing to his new occupation the same conscientious attention and practical appreciation of the problems laid before him, which he had always shown. Leaving this company, he was appointed chief engineer of the Oregon & Nevada railroad. The writer remembers the feeling of elation with which McClellan regarded this position, in which he hoped to bring himself prominently forward as a railroad engineer. Some will remember the notes published by him in the *Railroad Gazette* at this time, on the resistance of trains on curves, and of the experiments which led him to new and interesting conclusions. The Oregon & Nevada railroad suspended work, however, in 1882, after memorable and disgraceful scenes, during which the inhabitants of Reno were treated to the sight of two rival boards of

directors, each claiming legitimacy, and arguing the point with revolvers.

McClellan then became constructing engineer on the immense coal bunkers of the Northern Pacific railroad, at Tacoma, an illustrated article on which was published in the *Scientific American* of November 24th, 1883. And here it was that this truly good and honorable gentleman, this engineer of undoubted capacity, this kind friend, this man of whom it is not too much to say that his life was without a blemish, was destined to lose his life. The intense interest which he took in his work, leading him to an examination of the trestles he was then building, very early in the morning, before the workmen had turned out, was the indirect cause of the accident which then took place. Stepping on a loose plank, he was precipitated some thirty-five feet below, where he was picked up wounded to the death. An hour later the accident could not have happened. He lingered for some weeks, however, the valiant and patient side of his character coming out strongly. At first hoping cheerfully, always uncomplaining; and at last resigned and ready for what might come, he met his last summons, as he had met the trials of life, unflinchingly. Henry G. McClellan is no more. We must pity those that remain, the widow, the aged father, whose heads are bowed with grief, the friends whose loss is irreparable; but him we may envy, who falls after a short career, it is true, but one full of honorable acts, leaving only regrets and sorrow, and to his children a name unstained and forever honored.

JOSEPH MULLIN, JR., M. E., son of Joseph and Lydia M. (Ten Eyck) Mullin, was born in Watertown, Jefferson county, N. Y., May 29th, 1848. Attended the city schools, and entered the Institute in 1865. After graduation he studied law in his father's office, and soon entered upon its practice, which profession he has since followed. Has traveled extensively in this country and Europe. Member of the University Club, New York city. P. O. address, Watertown, N. Y.

WILLIAM ADORNO PECK, A. M., C. E., (Troy, N. Y.,) son of Eleazer A. and Lucy E. (Wildman) Peck, was born in Hartford, Hartford county, Conn., November 20th, 1844. Was really pre-

pared at the Troy High School, but took a college course and graduated at Yale in July, 1867, before entering the Institute. In special preparation for that he studied Bartlett's Mechanics with Mr. Hunt, formerly instructor at the Institute, and entered in September, 1867. He commenced professional work as a draughtsman on the Morrisania town survey in July, 1869. Was obliged, on account of ill health, to resign. Made a survey of the village of Chatham, Columbia county, N. Y., in connection with Professor Charles McMillan, during the summer of 1871. From September 1st until November 30th, 1873, and again from June 9th, 1874, to November 30th, 1875, was on the engineering corps of the New York and Canada railroad; stationed at Port Kent in 1873 and at Willsborough in 1874–75. Since then his work has not been strictly professional, excepting in February and March of 1880, when he was working with a United States department surveyor in Georgetown, Col. During periods of 1870 to 1875 was assistant to different professors in the Institute. In the winter of 1879–77 he took a special course in assaying in the Columbia School of Mines, New York city, and in May, 1877, took charge of a gold stamp mill at Idaho Springs, Col., remaining in charge to the fall of 1879, when he came east. In January, 1880, went to Georgetown, remaining till April, 1880, when he commenced work as examiner and calculator in the surveyor general's office in Denver, Col., which position he still holds. Received degree of A. B., and A. M., from Yale College, 1867 and 1870. Member of the Troy Scientific Society and American Association for the Advancement of Science. Married, November 16th, 1882, Mary F. Holme. P. O. address, Surveyor General's Office, Denver, Col.

ROBERT CHALMERS PEEBLES, C. E., son of John and Jane (Lapsley) Peebles, was born at Huntingdon, Huntingdon county, Pa., October 27th, 1847. Prepared at Mantua Academy, West Philadelphia, Pa., and entered the Institute in April, 1865. Commenced work as rodman on Pennsylvania railroad, July, 1869, at Pittsburgh, Pa.; transferred to Altoona as assistant engineer in charge of shops, April, 1870; transferred to Pittsburgh, November, 1870, as assistant engineer; promoted to assistant engineer in charge of Pittsburgh division, Pennsylvania railroad, April, 1872; transferred to middle division, Penn-

sylvania railroad, as assistant engineer in charge, January, 1875. Was given charge of the Summit Branch railroad, and coal shipments of same, as superintendent, July, 1876; resident engineer Texas & Pacific railroad, April, 1880, to April, 1881; assistant engineer Pennsylvania railroad, May, 1881, to July, 1882; superintendent Mexican National Construction Company, July 1882, to April, 1883; assistant superintendent southern general Division Mexican National railway, from October. 1883, to date. P. O. address, F. C. N. M. Cadena, No. 11, City of Mexico, Mexico.

JOHN PIERPONT, M. E., son of James and Millicent (Cowee) Pierpont, was born in Troy, Rensselaer county, N. Y., August 11th, 1849. He was a grandson of the Rev. John Pierpont, whose power as a poet and preacher have gained him a world-wide reputation. His mother died in 1856, and he became a member of the family of his uncle, David Cowee, Esq., of Troy. Prepared at Troy Academy, and entered the Institute in 1865. Remained at the Institute after graduation, for one year, as private assistant in analytical chemistry. In 1870, entered the service of United States company of engineers under Gen. Warren, at Newport, R. I., where he served about eighteen months. Here his eminent fitness for the work manifested itself, and he was promoted with wonderful rapidity. In 1871, Col. Houston, of the department of the Northwest, applied to General Warren for one or two competent engineers. Mr. Pierpont was recommended the applicant, and was until his last fatal illness connected with the work of this department. The young engineer carried to his new field of activity a fullness of knowledge and an energy of success and method which made him conspicuous. Working at first in the harbors of the lakes, he was soon promoted to the superintendency of the work of straightening the Wisconsin river, and was commended with rare praise for his ingenuity in applying the jetty principle to the work of dredging. His last labors were in connection with the canal between the Wisconsin and Fox rivers, intended to connect the Mississippi and the lakes. He also made a survey of the Wolf river in Wisconsin, and of the harbors of Superior and Duluth, on Lake Superior, having been detailed for that service. His ambition led him to suffer exposure in the personal

leadership of his men, and the malaria of the marshy regions preying upon his health, forced an illness which in two months caused his death. He died in Milwaukee, December 6th, 1879. John Pierpont was an earnest scholar. His calling led him away from literary pursuits, yet his writings, although not numerous, were marked by those graces of composition which adorn the productions of the elder John Pierpont. But back of his talents and attainments there was a tender manhood which endeared him to all those who came within the circle of his acquaintance. Married, October 22d, 1873, Ellen Ryan McGregor, daughter of John P. McGregor, of Milwaukee, Wis. Two children.

JOHN SQUIRES, C. E., (Troy, N. Y.,) son of John Norton and Emma Loraine (Bigelow) Squires, was born in Bennington, Bennington county, Vt., March 19th, 1849. Prepared at the Troy Academy, and entered the Institute in 1865. From November, 1869, to February, 1870, he was engaged in Central Park commission survey of town of Morrisania, N. Y.; July, 1870, to January, 1871, Syracuse & Chenango Valley railroad; January, 1871, to May, 1872, Pennsylvania railroad construction department; May, 2872, to March, 1876, Buffalo & Jamestown railroad. He left the profession in 1877 and went into the business of manufacturing collars and cuffs at Troy, N. Y., where he still remains. Member of the Rensselaer Society of Engineers, and treasurer of the Association of Graduates. P. O. address, Troy, N. Y.

ARTHUR BURR STARR, C. E., (Stamford, Conn.), son of Henry Burr and Ann E. (Ebbetts) Star, was born in Brooklyn, N. Y., September 24th, 1848. Prepared at the Collegiate and Commercial Institute, New Haven, Conn., and entered the Institute in September, 1865. Engaged on New York city survey, July, August and September, 1869; assistant in engineer's office, Philadelphia & Erie railroad, at Erie, Pa., February, 1870; appointed assistant engineer of the Philadelphia & Erie railroad, 1872; appointed engineer of the Philadelphia & Erie division of the Pennsylvania railroad, 1877; appointed superintendent of the Sunbury division of the Philadelphia & Erie railroad division of the Pennsylvania railroad, and superintendent

of the Shamokin division of the Northern Central railroad, September, 1881; also superintendent of the eastern division of the Pennsylvania company, December, 1881. Married, October 20th, 1877, Mary H. Bowman, daughter of Charles B. Bowman, of Cincinnati, Ohio. One child. P. O. address, Allegheny, Pa.

LOWELL HENRY STONE, C. E., (Auburndale, Mass.), son of Henry L. and Mary E. H. (Grace) Stone, was born in East Cambridge, Middlesex county, Mass., November 15th, 1847. Prepared at Allen's English and Classical school, West Newton, Mass., and entered the Institute in September, 1865. Employed first as assistant engineer on the Portland & Ogdensburg railroad, in Maine, August, 1869, remaining until August, 1871; during the spring of 1871 acted as assistant engineer and surveyor to A. R. Binney, C. E., of Brookline, Mass.; was employed in city engineer's office, Duluth, Minn., one month; in December, 1871, went to Chicago and passed the winter; April, 1872, entered the employ of the Lake Shore & Michigan Southern railroad, as assistant engineer, under the late Charles Collins; January, 1873, went to Troy, N. Y., where he was employed as civil engineer and surveyor; spring of 1874, Brookline, Mass., as civil engineer and surveyor, under A. R. Binney, C. E., for about three years, in construction of streets and improvement of real estate; 1878 and 1879, employed in the Monadnock paper mills, Bennington, N. H., and in 1880 accepted the position of assistant and resident engineer on the Burlington, Cedar Rapids & Northern railroad, at Iowa Falls, Iowa, remaining about two years; 1882, engineer of surveys and construction of Chicago, Iowa & Dakota railroad for six months; 1883, locating and resident engineer on Wisconsin, Iowa & Nebraska railroad, from February to December 31st, in making surveys and reconnoissance across the state of Iowa; in spring of 1884, assistant engineer on surveys for Iowa Southwestern railroad, between Des Moines, Iowa, and St. Joseph, Mo. Married, October 25th, 1871, Sarah A. Denyeau, daughter of Anthony Denyeau, of Troy, N. Y. Two children. P. O. address, Des Moines, Iowa.

WILLIAM ARMSTRONG THOMPSON, C. E., was born in Newton, N. J., November 18th, 1846. In 1870 was chief engineer of the Sussex railroad, Newton, N. J.; engineer of the Newark water works. P. O. address, 347 Belleville avenue, Newark, N. J.

CHARLES HORACE UTLEY, M. E., son of Horace and Charlotte (Spicer) Utley, was born in Buffalo, Erie county, N. Y., September 1st, 1847. Prepared at Williston Seminary, East Hampton, Mass., and entered the Institute in September, 1865. After graduating he entered mercantile life, and continues as a merchant to the present time. Was colonel and senior aid-de-camp to Governor Grover Cleveland. Married, June 17th, 1879, Mary Bach, daughter of Robert Bach, formerly of Brooklyn, N. Y. One child; deceased. P. O. address, Buffalo, N. Y.

THEODORE VOORHEES, C. E., son of Benjamin F. and Margaret E. (Sinclair) Voorhees, was born in New York city, June 4th, 1847. Prepared at Anthon's Grammar School, New York city, and entered Columbia college, class of 1868. Left in full standing, May, 1866, and entered the Institute in September, 1866. July, 1869, entered service of Delaware, Lackawanna & Western railroad, at Scranton, Pa., as assistant engineer, railroad department; spent about two years in coal department, and in December, 1872, was made superintendent of the Syracuse, Binghamton and New York railroad, at Syracuse, N. Y.; held that position until August, 1874, when he returned to the coal department at Scranton, Pa.; December, 1874, entered the service of the Delaware & Hudson Canal company, and March 1st, 1875, was made superintendent of the Saratoga & Champlain division northern railroad department; 1885, assistant general superintendent New York Central & Hudson River railroad. Married, September 19th, 1871, Sarah V. Gould, daughter of Judge George Gould, of Troy, N. Y. Wife died August 7th, 1872. Married, February 4th, 1874, Mary E. Chittenden, daughter of the late Harlow W. Chittenden, ex-general superintendent of the New York Central & Hudson River railroad, at Syracuse, N. Y. Six children. P. O. address, Grand Central Depot, New York city.

CLASS OF 1870.

HENRY NASH BABCOCK, M. E., (Watertown, N. Y.), son of the Rev. Theodore and Elizabeth (Nash) Babcock, was born in Ballston, Saratoga county, N. Y., December 20th, 1850.

Attended the High School, Watertown, N. Y., but was prepared principally by his father, at home. Entered the Institute in September, 1867. Entered upon the work of his profession September 22d, 1870, at Newport, R. I., two years and a half; New York city, one year; New London, Conn., five years; Dover, N. J., one year; New Haven, Conn., one year; engaged in teaching at the Institute six months, from February, 1871; at St. John's School, Manlius, N. Y., one year, from September, 1878. Designed and had built under his supervision various river and harbor works on the Connecticut coast, and N. E. exterior battery at Fort Trumbull, Conn., and mapped and laid out the United States powder depot at Dover, N. J.; graduated as mining engineer in 1870; practicing civil engineering since, principally under the United States engineer corps. P. O. address, Engineers' Office, United States army, New Haven, Conn.

JOSEPH TATNAL BAILY, C. E., was born in Paterson, Passaic county, N. J., September 20th, 1848. After graduation was located in St. Louis, Mo. He died in Jersey City, N. J., January 15th, 1873.

ANTHONY HOUGHTALING BLAISDELL, C. E., son of Fletcher and Sarah A. (Houghtaling) Blaisdell, was born in Coeymans, Albany county, N. Y., December 23d, 1848. Prepared at Coeymans Academy, and was a practical surveyor for four years before entering the Institute, September, 1866. In September, 1870, was called to a position on the Des Moines Rapids Canal, at Keokuk, Iowa, under General James H. Wilson, United States Engineers, as inspector on locks and lock work; afterwards served on same work as assistant engineer on section work, in charge of lines and estimates; in September, 1871, accepted charge of the surveys and reconnoisances, with a view to improvement by the United States government, under the immediate direction of General W. F. Reynolds, United States engineers, at St. Louis, Mo., of the following streams: Cuivre river, Mo., Current river, Mo. and Ark., Black river, Mo. and Ark., Tourche la Fave, Ark., Bayou Bartholomew, La.; in 1872 and 1873 was in local charge of survey and improvement of Osage river, Mo.; from 1874 to 1880 served as principal assistant engineer under Major Charles R. Suter, United States engi-

neers, on the improvement of the Mississippi, Missouri, Arkansas, White and St. Francis rivers; engaged on surveys, works of improvement, iron boat construction and design, and charge of office work; in charge of construction of snag boats and tow boats; in charge of reconnoisance of Mississippi river from Cairo to New Orleans in 1874; work has been principally confined to river hydraulics and boat and ship work, both in design and execution; in 1880 left the government service and became co-proprietor in the Western iron boat building company at South St. Louis, builders of iron and composite boats and barges, bridges, roofs, boilers, heavy wrought iron work, etc., in which business he is still engaged. Member of the American Association for the Advancement of Science, American Society of Civil Engineers, and Engineers' Club of St. Louis, Mo. Edited professional reports on works of surveys and improvements on rivers, etc., published in reports of chief of engineers, United States army. Married, August 6th, 1878, Mary McConnell, daughter of John McConnell, of Chicago, Ill. Two children. P. O. address, South St. Louis, Mo.

ARTHUR EDWIN BOARDMAN, C. E., son of Joseph M. and Caroline A. (Pierpont) Boardman, was born in Macon, Bibb county, Ga., March 20th, 1850. Prepared at Troy Academy, and entered the Institute in September, 1869. Began architectural drawing, Macon, Ga., October, 1870, and railroad surveying and engineering, November, 1870; continued on preliminary surveys throughout Georgia until 1872, when he was elected city engineer of Macon, Ga., and remained in this position until elected secretary and treasurer of gas light company, 1874; was made superintendent in 1878; erected water works for Macon, Ga., 1882–84. Married, October 30th, 1875, Reba W. Tallman, daughter of George C. Tallman, of Brooklyn, N. Y. P. O. address, Macon, Ga.

JUAN ANTONIO GONZALEZ Y CAMPUZANO, JR., C. E., son of Juan Gonzalez y Acosta and Juana Campuzano y Lenaies, was born at Matanzas, Isle of Cuba, January 22d, 1874. Prepared at Bristol High School, and entered the Institute in September, 1866. Since May, 1872, merchant in Matanzas. Member of the Rensselaer Society of Engineers, and American Society of Engineers. Married, June 8th, 1882, Adelaide Maza del Castillo,

daughter of Jose Maria Maza Nuebra. P. O. address, Commercio, No. 5, Matanzas, Cuba.

JACOB ESHER HEYL, A. M., B. S., son of John B. and Jane C. (Esher) Heyl, was born in Philadelphia, June 2d, 1849. Prepared with A. B. Ivins, A. M., Friends Central School, Philadelphia, and entered the Institute in October, 1866. In December, 1870, took charge of Philadelphia sugar house; proprietor of the same from 1875—firm, Heyl Brothers. Married, March, 1877, Ella Carmault Willis, daughter of James Carmault Willis. One child. P. O. address, 621 North Sixteenth street, Philadelphia, Pa.

GEORGE HENRY MANN, C. E., son of George M. and Kate C. (Nash) Mann, was born in New York city, March 14th, 1851. He was trained to his profession by the most thorough and severe course that this country affords, having been graduated first at the Brooklyn Polytechnic and subsequently at the Institute, which he entered in 1867. In 1870 entered upon the work of his profession in New Haven, Conn., as city surveyor, also in charge of harbor improvements; was a member of the United States engineer corps, engaged on the coast survey. He made the surveys, drew the maps, profiles, sections and plans for the West River canal, and was about to superintend its construction. He had just been appointed assistant engineer over the new Quinnipiac bridge, and was in every way on the high road to an extensive and valuable business, when, by an accident on the Canal railroad, he was fatally injured, and died on Thursday evening, June 11th, 1874. He was much employed as an expert in disputed surveys, and his opinion in such cases was highly valued. He was a man of thorough and wide training outside of his specialty, being a practical chemist of no mean order, and a good linguist. Had written for the *Scientific American*, *London Chemical News*, *New York Engineering Magazine* and *Van Nostrands*. Married, October 31st, 1872, Charlotte A. Mourette de Ruchant, daughter of Arsine Mourette de Ruchant. Two children.

CHARLES ROE MATHER, M. E., son of Charles Lee and Annie L. (Whelan) Mather, was born in New York city, July 24th, 1849. Prepared at Grammar School No. 35, (Thirteenth street),

New York city, and attended the College of the City of New York one year. Entered the Institute in November, 1866. March, 1871, assistant United States engineer to the late General G. K. Warren, corps of engineers, United States army, with headquarters at Newport, R. I., and engaged for the four years following on many hydrographical surveys, (small and extensive), both as assistant and in charge; during the year 1878 as engineer in charge of levels on survey for the new water supply for New York city; engaged as a student of law from 1875 to 1876, and in the practice of law from from 1876 to 1878; was engaged in locating eighty miles of canal line in summer of 1878, for conducting water from the Housatonic river to the Croton basin, under the direction of the department of public works, New York city; in employ of United States customs, New York city, since 1879. Received honorary degree of LL. B. from New York University in 1876. P. O. address, Ridgefield, Bergen county, N. Y.

THOMAS O'NEIL MORRIS, C. E., son of Thomas A. and Elizabeth R. (Irwin) Morris, was born at Indianapolis, Marion county, Ind., May 30th, 1846. Prepared in Major James M. Whittemore's ordnance corps, United States army, and entered the Institute in 1867. From July, 1870, to September, 1873, assistant engineer Indianapolis & St. Louis railroad; September, 1873, to September, 1876, general contractor public works; September, 1876, to March, 1884, chief engineer Indianapolis, Cincinnati & La Fayette railroad; since March, 1884, engineer maintenence of way, Cincinnati, Indianapolis, St. Louis & Chicago railway and branches. Married, November 16th, 1871, Estelle Jeanne Goodale, daughter of Charles Chester Goodale. Five children. P. O. address, Indianapolis, Ind.

ROBERT CHRISTMAN NEAL, M. E., son of William and Catherine (Christman) Neal, was born at Bloomsburg, Columbia county, Pa., March 30th, 1848. Prepared by Prof. Griffin, Williamstown, Mass., and entered the Institute in 1865. Has never practiced his profession, but engaged in the manufacture of pig iron. Married October 19th, 1873. Two children.

GEORGE DALLAS NICKEL, M. E., (Connellsville, Pa.), son of George and Elizabeth (Fisher) Nickel, was born in New Haven,

Fayette county, Pa., November 7th, 1847. Prepared at the Agricultural College of Pennsylvania, and was employed as bookkeeper in his father's office. Entered the Institute in September, 1866. Began, in August, 1874, at Central City, Colorado, the survey of gold and silver mines, both surface and underground, remaining one year; October, 1875, removed to Del Norte, Colorado, and was there engaged in mining surveys for a few months; returned to Denver, Col., in winter of 1875–76, where he was for six months employed as draughtsman in mineral division of United States surveyor-general's office; returned to Del Norte, Col., in spring of 1876, where he has since lived and practiced his profession; has held continuously, since 1874, a commission as United States deputy mineral surveyor, and a great deal of his professional work is done under that commission; in 1871 and 1872 was engaged with his father at Connellsville, Pa., in the flour and grain business, under the firm name of George Nickel & Son; in addition to his professional practice is to a small extent engaged in gold and silver mining. Received honorary degree of M. E. from the Institute. Member of the American Association for the Advancement of Science. Married, September 23d, 1875, Mary Blackstone, daughter of James Blackstone, of Connellsville, Pa. Two children. P. O. address, Del Norte, Rio Grande county, Colorado.

EDWARD PARRISH, C. E., son of Edward and Margaret Shreve (Hunt) Parrish, was born in Philadelphia, Pa., February 24th, 1850. Prepared under the instruction of Mr. Caleb S. Hallowell, Pa., and entered the Institute in September, 1867. September, 1870, instructor in physics and mechanical drawing, Swarthmore College, Pa.; February, 1871, mining engineer Grand Tower mining, manufacturing and transportation company, until September, 1871; then assistant superintendent of furnace department of same company until June, 1871, when he resigned to accept the position of assistant engineer of construction department of Pennsylvania railroad; continued in service of Pennsylvania railroad until June, 1874, when he was appointed assistant light house engineer, fourth district, government service; continued in this service until February, 1881; then resigned to accept position as assistant engineer in charge of a party on location on the Denver & Rio Grande Western

railroad; in March, 1882, was entirely incapacitated from work, owing to a severe attack of rheumatism; August, 1882, assistant engineer fourth light house district, in charge of fourteen foot bank light house, Delaware bay, until January, 1884; February, 1884, manager Brooklyn branch of Durham house-drainage company, of New York. The Cross Ledge Shoal light house, Delaware bay, was built under his superintendence, and also the Ship John Shoal light house, Delaware bay. The range light system of the Delaware river, from the head of the bay to Philadelphia, embracing twenty-one structures, including five wrought iron towers designed by him, were all, with the exception of six small frame structures, constructed under his supervision. He located fifty miles of the Denver & Rio Grande Western railroad, including thirty miles from the summit of the Wasatch range of mountains eastward. Member of Franklin Institute, Pennsylvania, and Engineers' Club, Philadelphia. Married, December 27th, 1871, Mary K. Evans, daughter of Joshua D. Evans, of Orange, N. J. Three children. P. O. address, Room 10, Garfield Building, 26 Court street, Brooklyn, N. Y.

JOHN HAMPDEN RANDOLPH, C. E., son of John Hampden and Emily Jane (Liddell) Randolph, was born in Bayou Goula, Iberville Parish, Louisiana, October 3d, 1844. Served three years in the Confederate army prior to the close of the late war. Remained at home one year, devoting that time to preparation for the Institute, and entered in September, 1866. Devoted the two years following graduation to sugar planting; October, 1880, was elected instructor of practical mechanics at Louisiana State University and Agricultural and Mechanical College; two years later was elected professor of mechanical engineering at the same institution, which position he is occupying at the present time; September, 1878, patented an agricultural contrivance known as Randolph's pea vine hay rake, which has proved quite a popular machine among the sugar planters. They are manufactured at Baton Rouge, La., under his personal supervision, and are sent to different parts of the state for disposal. He assisted in establishing the P. H. Scientific Society at Troy, N. Y., in 1867, (the name having been since changed to Rensselaer Society of Engineers), of which he is still a member. Married,

January 14th, 1873, Sarah Johnson Walker, daughter of William B. Walker, a Virginian by birth, but subsequently became a resident of the state of Louisiana. Two children. P. O. address, Baton Rouge, Louisiana.

JAMES DUNCAN RAYNOLDS, C. E., (Grand Rapids, Mich.), son of James Lusk and Mary Green (Duncan) Raynolds, was born in Massillon, Stark county, Ohio, August 25th, 1846. Prepared at the High School, Chicago, Ill., and entered the Institute in September, 1864. July, 1870, to October, 1871, landscape engineering and water works, at Riverside, Ill.; summer of 1872, preliminary survey for Lansing and Lake Michigan railroad; fall of 1872, park and cemetery at Marquette, Mich; 1873–74, consulting engineer for architects, Chicago, also survey for town site and harbor, at Wolf Lake, Ind.; 1879, assistant engineer United States reservoir survey, and in charge of survey of headwaters of the Wisconsin river; 1880, and since, rose growing at Riverside, Ill.; 1874–78, member board of trustees, village of Riverside, and chairman committee on roads and parks. Married, March 27th, 1883, Julia Tevis Board, of Louisville, Ky., daughter of Buckner Board, colonel of volunteers, United States army. P. O. address, Riverside, Cook county, Ill.

HENRY AUGUSTUS ROWLAND, C. E., Ph. D. *See Assistant Professors, page 164.*

NATHANIEL EDWARDS RUSSELL, C. E., son of Charles P. and Louisa (Richardson) Russell, was born at Washington, D. C., February 24th, 1848. Entered the Institute in September, 1867. From August, 1870, to May, 1871, assistant engineer, United States engineer's office, Newport, R. I.; May, 1871, to July, 1875, assistant engineer, United States engineer's office, Chicago, Ill.; September, 1875, to February, 1876, assistant engineer, lower bridge, Albany, N. Y.; July, 1876, to January, 1882, clerk of Wiley & Russell manufacturing company, Greenfield, Mass.; January, 1882, to March, 1883, general manager Allegheny coal and iron company, Richmond, Va.; since March, 1883, president and treasurer Allegheny coal and iron company; also, since same date, general manager Henrico coal company, Richmond, Va. Married, July 1st, 1874, Lucy Coleman Flack, daughter of David

H. Flack, of Lansingburgh, N. Y. One child. P. O. address, 103½ West Clay street, Richmond, Va.

CHARLES HENRY SCOTT, M. E., son of John C. and Louisiana E. (Slessman) Scott, was born in Philadelphia, Pa., June 29th, 1849. Attended Philadelphia Polytechnic six or eight months, leaving to accept position of captain's clerk on United States man of war Tacony, on blockade duty; resigned at close of war, and came direct to the Institute, entering in September, 1865. Entered the firm of John C. Scott & Sons, 1871, and has had general charge of their several coal mines; also engaged in the general business of mining and shipping coal from their collieries in Clearfield county, Pa. P. O. address, 335 Walnut street, Philadelphia, Pa.

JUSTUS MITCHELL SILLIMAN, M. E., son of Joseph and Martha A. (Mitchell) Silliman, was born in New Canaan, Fairfield county, Conn., January 25th, 1842. Prepared at the Troy Academy, and entered the Institute in September, 1867, sophomore class. Served in the Union army three years during the civil war, and was wounded at the battle of Gettysburgh. September, 1870, took charge of the departments of mining engineering and graphics in Lafayette College, Easton, Pa., where he still remains in the George B. Markle professorship. Fellow of the American Association for the Advancement of Science, member of the American Society of Mining Engineers, and secretary of the Lehigh Valley Microscopical Society. Wrote "The Examination of the Bessemer Flame with Colored Glasses and with Spectroscope," in Proceedings of A. A. A. S., 1870, and "Instruments for Projective Drawing," Proceedings A. I. M. E., 1882. Married, June 29th, 1876, Harriet D. Boughton, daughter of Ezra W. Boughton, of Troy, N. Y. One child. P. O. address, Lafayette College, Easton, Pa.

EDWARD SOTHERS, M. E., (Valparaiso, Chili,) was born in Tacna, Peru, June 11th, 1849. Mining engineer, Valparaiso, Chili.

WILLIAM C. STRAWBRIDGE, M. E., was born at Oxford, Chester county, Pa., June 24th, 1848. Entered the Institute in September, 1866. Appointed assistant superintendent Pennsylvania

steel works, but declined the appointment, and commenced the study of law with Judge T. Carroll Brewster, in Philadelphia, January, 1871; admitted to Philadelphia bar, January, 1873; Judge Brewster being appointed attorney general of Pennsylvania, he was appointed assistant in his personal practice; practiced in the state and United States courts till January, 1874, since which time he has been associated in law practice with Mr. George Harding, the eminent patent lawyer, of Philadelphia. Married, December 27th, 1871, in Troy, N. Y. P. O. address, Philadelphia, Pa.

CLASS OF 1871.

FREDERICO M. ALCOVER, C. E., was born September 25th, 1846, at Sagua la Grande, Cuba, W. I., where since graduation he has practiced his profession, and is now director of a newspaper. P. O. address, Sagua la Grande, Cuba, W. I.

MIGUEL DE TEIVE E ARGOLLO, C. E., son of Miguel de Teive e Argollo and Maria Murtha de Argollo Pina e Meilo, was born in Bahia City, Brazil, May 10th, 1851. His teacher was Dr. Abilio Cezar Borges, to-day Baron of Macahubas. Entered the Institute in September, 1867. In 1872 began his profession as assistant engineer of the Sorocabana railroad, Brazil; in 1873, made the first exploration of the Conte d'Eu railroad, Brazil; in 1874 entered the Brazilian government service, and was made chief engineer in the Vi Ami railroad explorations and other commissions; in 1879 left the government service, and received from the government the concession and privilege of the Bahia & Minas railroad; in 1881 and 1882, as chief engineer, he constructed one hundred and forty-two kilometres of the Bahia & Minas railroad; is now one of the directors and the general manager of the road; has now a contract with the Brazilian government for the construction of a part of the Ramal de Suro Prete of the Dom Pedro Second railroad. All the works of the Bahia & Minas railroad have been designed and built under his direction. By the official inauguration of the Bahia & Minas railroad, November, 1883, the Emperor gave him the title of

"Commendador da Imperial order da Rosa," which he did not accept, being a Republican. Member of the "Club d' Engentaria," Rio de Janeiro, Brazil. Has published "Formularis de Engentaria," Rio Janeiro, 1875; Viacas Ferrea de Nort de Minas," 1878; "Memoria Descriptiva de Estrado de Ferro Bahia e Minas," Rio de Janeiro, 1883. Married, November 27th, 1880, Jovianna Crissiuma, daughter of Francisco Antonio de Freitas Crissiuma. Two children. P. O. address, Hospicio 47, Rio de Janeiro, Brazil.

WILLIAM LATIMER BAKER, C. E., son of William and Francis C. (Latimer) Baker, was born in Toledo, Lucas county, Ohio, June 16th, 1850. Prepared at Toledo public schools and Springside School, Pittsfield, Mass., and entered the Institute in the fall of 1868. Commenced work in August, 1871, at Hannibal, Mo., on Mississippi river bridge, at that point, remaining until its completion; assistant engineer on Missouri river bridge, at St. Joseph, Mo., having especial charge of river improvements; in October, 1882, assistant engineer Detroit bridge and iron works, Detroit, Mich., and still remains there, the last few years as superintendent and engineer. Designed structures built by Detroit bridge and iron works, of Detroit, Mich., including numerous railroad bridges, viaducts, etc. Member of the American Society of Civil Engineers, and Western Society of Engineers. Married, November 25th, 1879, Kate P. Mead, of Lockport, N. Y. One child. P. O. address, Detroit, Mich.

WILLIAM S. BATES, M. E., was born in Cincinnati, O., February 7th, 1852. Entered the Institute September, 1867. Student of mining engineering, Berlin, October, 1871, to April, 1872, and of civil engineering in Dresden, April, 1872. At present is a civil and mechanical engineer and contractor. P. O. address, 71 Major Block, Chicago, Ill.

ALFRED SPANG BERTOLET, M. E., (Reading, Pa.,) son of Peter G. and Amelia K. (Spang) Bertolet, was born in Oley, Berks county, Pa., August 18th, 1849. Prepared at Reading High School, and entered the Institute September, 1867. Was assistant engineer Atlantic & Great Western railroad, April, 1873, to September, 1873, Meadville, Pa.; assistant in chemistry at the Institute from September, 1873, to June, 1875; chemist to the

Himrod furnace company, Youngstown, O., from July, 1875, to January, 1876; chemist Crown Point iron company, Crown Point, N. Y., from January, 1876, to July, 1883; superintendent Copper Bell mining company, Florence, A. T., August, 1883, to January, 1884; since then chemist to Chateaugay ore and iron company, and to Crown Point iron company. Student of chemistry, metallurgy, &c., 1871–73, at Berlin, Clausthal and Freiberg, Germany. Member of American Institute of Mining Engineers. P. O. address, Crown Point, N. Y.

HENRY M. BOARDMAN, C. E.. was born at Boardman, Mahoning county, O., June 18th, 1849. Entered the Institute in 1866, and remained for one year and a half; then left for one term; returned and finished the course. Was elected County Surveyor of Mahoning county, O., 1873; afterward engaged in the drug business. Married, February 13th, 1872. One child. P. O. address, 689 De Kalb Avenue, Brooklyn, N. Y.

ARTHUR WELLINGTON BOWER, C. E. *See Professors, page 161.*

MILTON W. ENSIGN, C. E., was born at Lisle, N. Y., June 19th, 1848. Entered the Institute in February, 1868. Entered upon the work of his profession August 7th, 1871, as assistant engineer on the Texas & Pacific railroad, at Sherman, Tex.; assistant engineer on the Galveston, Harrisburgh & San Antonio railroad; assistant engineer on the Burlington & Missouri railroad, Omaha, Neb.; resident engineer on the R. V. railroad, Pawnee City, Neb.; engineer of the Burlington & Missouri railroad, Lincoln, Neb. Member of Rensselaer Society of Engineers. Married, September 26th, 1876, Ida A. Baird, daughter of E. G. Baird. P. O. address, Lincoln, Neb.

ALBERT WILLIS FOSTER, C. E., (Madison, Ga.,) son of Albert G. and Caroline (Colbert) Foster, was born in Bibb county, Ga., June 26th, 1847. Prepared at the Mercer University, Penfield, Ga., and entered the Institute, fall term of 1867. Commenced merchandising in the city of Madison, Ga., in 1874, and continued in that business until 1881. Is now president and half owner of the Georgia Pioneer knitting mills, Atlanta, Ga. Married, November 13th, 1872, Louise Hill, daughter of Joshua Hill. Two children. P. O. address, Atlanta, Ga.

FREDERICK LEMAN GARLINGHOUSE, C. E., was born at Littleville, near Canandaigua, Ontario county, N. Y., August 19th, 1849. His father was Leman B. Garlinghouse, class of 1837. His mother was Martha Ann Spalding, of Lockport, N. Y. His school life was passed at Canandaigua, where his parents took up their residence while he was very young. Up to the age of sixteen he attended the public schools. Entering the Canandaigua Academy, one of the oldest institutions of learning in western New York, he graduated three years later, June, 1868, and entered the Institute the following fall. His preparatory course at the academy, under its efficient principal, N. T. Clarke, had been so thorough that he was able to pass examination on the first year's studies, thus joining the class of '71. Upon leaving the Institute, a position was accepted on the Pennsylvania railroad, under Mr. Yardley, at Altoona, Pa. Very little constructive engineering offering here, the duties being mostly routine office work, this position was exchanged for another at Wilkesbarre, Pa., under Mr. Rothwell. Outside work here consisted mostly in mine surveying (anthracite coal mines); office duties in making maps of these surveys and draughting in general. This was good practice for a young engineer, and was entered upon with enthusiasm. After being here about three months, a better position was offered him as assistant engineer on the Boston & Maine railroad, at Saco, Me., under Mr. Henry Bacon, chief engineer, and he entered upon his duties the first of the year 1872. The Boston & Maine road was building an extension to their line from S. Berwick to Portland, Me., a distance of some forty-three miles. The construction, although expensive, was not very difficult in an engineering point of view, embracing the building of much masonry for numerous iron bridges, and many long pile bridges, besides some very good specimens of stone arches. Upon the completion of this work, in the spring of 1873, the position of principal assistant engineer was accepted, under Mr Johnson, on the Portsmouth & Dover railroad, a new road running between these points, about ten miles long. There was some heavy earthwork on this line, and difficult pile bridges to build. One in particular over the Piscatauqua river gave a good deal of trouble. It was something over two thousand feet in length, with a depth of forty feet of water near the center of the stream, running at ebb tide

between four and six miles per hour. After getting nearly across, the driving gave out, the bottom becoming rocky, and a truss span of 500 feet had to be put in to fill the gap. This span was a Howe truss. It was built complete on temporary false work in slack water, on the up-stream side of the bridge. Two lighters were placed under it at low water, and it was floated into position at high water, the lighters bound firmly to the pile piers, when the span slowly settled on its seats as the tide went out. This work was completed in the spring of 1874, and in the fall of the same year he accepted a position as assistant to Mr. S. J. Fields, engineer of the Niagara bridge works, at Buffalo, N. Y. Here he remained nearly five years, and obtained a knowledge of iron bridge construction. In the fall of 1879 he became engineer for the Missouri Valley bridge and iron works, located at Leavenworth, Kan., where he was engaged in building bridges, ranging from short and light highway construction to long and heavy railroad spans. Another year was passed in St. Louis, in designing bridges, when he became engineer of the Pittsburgh Bridge company, where he still remains. While in St. Louis, he wrote a number of articles on "Practical Bridge Construction," for the *American Engineer*, of Chicago. He hopes shortly to extend these articles, and publish them in book form. Married, April 3, 1878, Mary Ellen, only daughter of Capt. Samuel Gillpatrick, of Saco, Me. P. O. address, Pittsburgh Bridge Co., 36th street. Pittsburgh, Pa.

ALBERTO VALENTIN DE GOICOURIA, C. E., (New York city,) son of Felipe and Rosa de (Aranguren) Goicouria, was born in Havana, Cuba, October 23d, 1848. Prepared at Colegio Del Salvador, Havana, Cuba, and entered the Institute September, 1865. Entered upon the work of his profession September, 1871, with Charles Macdonald, C. E., bridge builder, New York city, remaining one year. Banker and broker, New York city, 1872; member New York Stock Exchange, May, 1873. Married, November 21st, 1877, M. Cecilia Wall, daughter of William Wall, of New York city. Two children. P. O. address, No. 28 West 56th street, or Mills Building, Broad street, New York city.

CHARLES LOOMIS GRIMES, C. E., son of A. L. and Mary S. (Wellington) Grimes, was born in Mansfield, Richland county, O., October 30th, 1849. Prepared at Mansfield High School,

and entered the Institute, 1867. July, 1871, to September, 1872, was assistant engineer M. P. & L. M. railroad, Tiffin, O.; September, 1872, to September, 1873, iron inspector A. & G. W. railroad, Cleveland, O.; September, 1873, to 1877, draughtsman Mansfield machine works, Mansfield, O.; 1878–80, assistant engineer LaClede bridge company, St. Louis, Mo.; 1880–84, superintendent Moline iron works, Moline, Ill. Member of Rensselaer Society of Engineers. Married, January 12th, 1875, Mary A. Miller. Two children. P. O. address, Moline, Rock Island county, Ill.

ALFRED POTTER KIRTLAND, C. E., son of Billions and Ruthanna (Frame) Kirtland, was born at Poland, Mahoning county, O., May 24th, 1854. Prepared at Poland Union Seminary. Resided at place of birth, engaged on farm when not at school, and entered the Institute September, 1867. Employed as assistant engineer on Indiana North & South railroad, intended to connect Chicago with Evansville on the Ohio river, from July, 1871, to February, 1872; assistant to principal assistant engineer of Western division Bennett's Branch railroad, February to December, 1872, at which time he made most of the drawings for the arch culverts and bridges on the same; assistant engineer West Pennsylvania division of the Pennsylvania railroad, December, 1872, to September, 1881, when he was promoted to superintendent of this division, and still holds the position. The West Pennsylvania depot at Allegheny was built under his supervision. Held the office of councilman, Blairsville, Pa., for one and a half years previous to September, 1881. Married, October 10th, 1876, Lucy M. Shields, daughter of Alexander Shields, of Blairsville, Pa. One child. P. O. address, Blairsville, Indiana county, Pa.

GEORGE COGGSWELL MACGREGOR, C, E., (Brooklyn, N. Y.,) was born in Elizabeth, N. J., August 11th, 1849. Entered the Institute September 28th, 1867. On September 27th, 1871, became assistant engineer of construction on the Pennsylvania railroad; afterward assistant, and then principal assistant of maintenance of way, with residence at Altoona, Pa. Resigned. P. O. address, 313 Washington avenue, Brooklyn, N. Y.

M. WILLIAM MANSFIELD, C. E., was born in Ashland, Ashland county, O., November 19, 1850. Entered the Institute Septem-1st, 1867. Entered upon the work of his profession September ber, 1871; was one year and a half with the C. & M. V. railroad, Zanesville, O.; nine years with P. C. & St. L. railroad, Zanesville, O.; one year and a half with Chicago, St. Louis & Pittsburgh railroad, Richmond, Ind. Member of the American Institute of Civil Engineers. P. O. address, Richmond, Ind.

J. HARROD MARKS, C. E., was born in New Orleans, La., November 17, 1850. He was a resident of New York city. Soon after graduation, was assistant engineer on the Southern Pacific railroad, and was located at Jefferson, Texas. It is said that on account of his rapid promotion, much jealousy was excited among the men engaged on the road, and it is supposed that his death was caused by some foul treatment. A large reward was offered for his remains, which, however, were never discovered. He died November 2d, 1871.

HENRY GRANT MORSE, C. E., son of Henry K. and Mary A. (Linn) Morse, was born in Poland, Mahoning county, O., April 10th, 1850. Prepared at Poland Union Seminary, Prof. M. C. Butler; was assistant city engineer of Youngstown, O., before entering the Institute; entered February, 1868. July 10th, 1871, assistant engineer Bennett's Branch extension of Allegheny Valley railroad; January, 1872, superintendent and engineer Keystone land and oil company, Parker, Pa.; September, 1872, engineer to the Wrought Iron Bridge company, in charge of masonry for bridges over the Allegheny river at Foxburg and Parker, Pa.; March, 1873, engineer to Wrought Iron Bridge company, Canton, O.; January, 1878, partner in Morse Bridge company, Youngstown, O. Designed and built masonry and approaches of bridges at Foxburg and Parker, Pa.; bridges on Michigan Central railroad, at East Saginaw; Lancaster Avenue, Reading, Pa.; Sterling, Ill.; Connecticut Western railroad, New Hartford, Conn.; Pittsburgh & Lake Erie railroad, Struthers, O.; Broad street, Columbus, O.; Chicago & Western Indiana railroad, Cicero, Ill.; and blast furnaces for Mahoning Valley iron company, Youngstown, O. Member of the American Society of Civil Engineers, Rensselaer Society of Engineers,

Western Pennsylvania Society of Engineers, and American Society of Mining Engineers. Married, April 29th, 1873, Mary M. Killikelly, daughter of Rev. Dr. B. B. Killikelly. Five children. P. O. address, Youngstown, O.

EDWARD NICHOLS, B. S., (Tarrytown, N. Y.,) son of George M. and Maria (Bent) Nichols, was born in Middlebury, Addison county, Vt., September 13th, 1850. Prepared at Irving Institute, D. S. Rowe, principal, and entered the Institute September, 1867. Was appointed assistant in chemistry and natural science in the Institute in 1870, before graduation, and held the position for two years. Commenced work with Bethlehem iron company July, 1872; February, 1873, assistant superintendent Standard steel works, until June, 1875, when he went to Europe for a year, studying iron and steel manufacture, returning to the United States in February, 1876. During the Centennial he acted as assistant secretary of the central committee of the American Institute of Mining Engineers at Philadelphia. In the spring of 1877 he traveled in the South, looking up iron matters, and was then employed by J. A. & I. T. Burden, of Troy, N. Y., to make a general examination and report on all the iron-making regions of the West and South, besides some similar work in the East; was engaged in this until December, 1878, when with others he purchased the Ridge Valley iron works, where, since that time he has been engaged in making charcoal car wheel iron, as president and superintendent of the above company. P. O. address, Hermitage, Floyd county, Ga.

JOHN BODO OTTO, C. E., (Williamsport, Pa.,) son of Henry M. and Susan B. (Goodhart) Otto, was born in Reading, Berks county, Pa., March 9th, 1851. Removed to Williamsport, Lycoming county, Pa., in 1863, and there attended Dickinson Seminary and Moyer Academy, previous to entering the Institute in September, 1867. In the fall of 1871, at Reynoldsville, Jefferson county, Pa., assisted in the construction of the division of the Bennett's Branch extension of the Allegheny Valley railroad; in the spring of 1872 served upon the city engineers' corps of Reading, Pa., but accepted the position of assistant engineer upon the location corps of the Philadelphia & Reading railroad; left this position to join engineer corps to run a line

from Williamsport to Arnot, Tioga county, Pa., in the spring of 1873; after running experimental line, the work was abandoned on account of the panic in that year. Located in Williamsport, Pa., as civil engineer, and also engaged in the lumber business under the firm name of H. M. and John B. Otto, in 1875. In May, 1876, was elected city engineer, to serve two years; was twice re-elected to the same position, and resigned in April, 1880. January, 1881, in addition to business mentioned above, he accepted the superintendency of the South Williamsport land company. January, 1882, was appointed trustee for the estate of Mahlon Fisher, and in September, 1882, was elected secretary and treasurer of the Williamsport gas company, which position he still holds. His interest in the lumber business is in the firm of Otto, Lowe & Co. He married, March 11th, 1873, Mary Lillie Ladd, daughter of Samuel Ladd. Four children. P. O. address, Williamsport, Pa.

RICHARD PRESCOTT, M. E., (Albany, N. Y.,) son of George Palmer and Avis Ellen (Alden) Prescott, was born in Troy, N. Y., October 25th, 1859. Attended State St. High School, Albany, N. Y., and entered the Institute February, 1868. From July to November, 1871, assistant United States engineer New York harbor improvement; November, 1871, to January, 1871, assistant engineer New York, Utica & Ogdensburg railroad; January, 1872, to January, 1878, assistant professor of physics in Albany High School; January, 1878, to January, 1884, professor of physics in the same school. January, 1884, sanitary and steam heating engineer, firm of Fuller, Wheeler & Prescott, architects and sanitary engineers; chief engineer Saratoga, Mount McGregor & Lake George railroad, April, 1883. Member of Albany Institute, Rensselaer Society of Engineers, and Dana Natural History Society. Married, April 3d, 1883, Augusta Lois Salisbury, daughter of Nelson H. Salisbury. P. O. address, 86 State street, Albany, N. Y.

SPENCER VICTOR RICE, C. E., son of Victor M. and Maria L. (Winter) Rice, was born in Buffalo, Erie county, N. Y., December 24th, 1847. Attended Buffalo Central School and Bryant & Stratton's Mercantile College, Buffalo, N. Y. Entered the Institute in February, 1866. In October, 1871, was offered and accepted the position of instructor in graphics and field work

(now styled instructor in drawing) at the Lehigh University. Held the office of borough engineer of Bethlehem, Pa., from the fall of 1883 to the spring of 1884. He was awarded a first premium medal and a certificate for mechanical drawing at the International Exhibition at Buffalo, N. Y., in 1873. Since his engagement at Lehigh University he has acted as teacher of mechanics, mathematics, surveying, descriptive geometry, drawing, etc. Is now teaching descriptive geometry and drawing. Married, July 8th, 1873, Emily J. Whitesell, of Bethlehem, Pa., who died February 12th, 1877. Married, July 10th, 1879, Eliza M. Kingston, of Buffalo, N. Y. Two children. P. O. address, Bethlehem, Northampton county, Pa.

CHARLES GUSTAVUS ROEBLING, C. E., son of John A. and Jane (Herting) Roebling, was born in Trenton, N. J., December 12th, 1849. Prepared at schools in Philadelphia, and entered the Institute in 1868. Member of the "John A. Roebling's Sons Wire Rope Manufacturing Company," manufacturers of iron wire, wire cloth, rope, barbed wire, copper wire, etc. He designed and directed the manufacture of apparatus and machinery for the lowering, transporting and placing of the Egyptian obelisk in Central Park, New York city. Married, January, 1879, Sally Ormsby, of Pittsburgh, Pa. Five children; three living. P. O. address, Trenton, N. J.

CHARLES FRANKLIN ROPES, M. E., (Orange, N. J.,) son of David M. and Lydia L. (Bisbee) Ropes, was born in West Meriden, Conn., December 11th, 1847. Prepared in the private school of F. A. Adams, Orange, N. J. In employ of the Russell & Erwin Manufacturing Company, of New York city, for three years previous to entering Institute, in September, 1867. In October, 1871, he entered upon the work of his profession in Indianapolis, Ind., running Dank's rotary puddling furnaces for fifteen months. Moved to Railroad district, Nevada; was bookkeeper, assayer, etc., for mining company for one year; since then has been in California in the hardware business. He is now traveling from Sacramento for the wholesale hardware house of Baker & Hamilton. Married, June, 1879, Sadie Walker, of Indianapolis, Ind., daughter of Samuel R. Walker. Two children. P. O. address, Sacramento, Cal.

RICHARD SCHERMERHORN, C. E., son of Derrick and Mary (McChesney) Schermerhorn, was born in Brunswick, Rensselaer county, N. Y., December 7th, 1848. Was employed on homestead farm during the summer, and attended the Troy High School winters, graduating from there (Classical Course) June, 1867. Entered the Institute in September, 1867. Served as second assistant engineer, department of parks, New York city, from September 11th, 1871, to January 1st, 1872; accepted position of chainman, and was promoted to transitman during surveys of New York, West Shore & Chicago railroad between Newburgh and Catskill, and Utica and Canastota, February 1st, 1872, to June 9th, 1872; located line between Cherry Valley and Richfield Springs for Delaware & Hudson Canal Co., July 1st, to September 30, 1872; was engineer for Long Island Land Company, of Boston, from May 24th to August 1st, 1873, at Springfield, L. I.; assistant to division engineer in charge of twelve miles of construction of New York & Canada railroad, August 1st, to September, 1873; appointed chief engineer of Prospect Park & Coney Island railroad February 1st, 1874, and on January 1st, 1875, was made chief engineer and superintendent of this company. At present is in same position, having charge of all departments of construction, operatives and repairs, including construction of New York and Coney Island railroad and re-erecting of Coney Island observatory. Married, January 30th, 1876, Jennie A. Fiske, of Brooklyn, N. Y. Two children. P. O. address, 183 Prospect Place, Brooklyn, N. Y.

RUSSELL DAVID WALBRIDGE, C. E., (Detroit, Mich.,) son of Wells David and Lydia S. (Russell) Walbridge, was born in Buffalo, N. Y., July 1st, 1849. Prepared at Mathematical and Classical School for Boys, Philo M. Patterson, principal, Detroit. Lived in Buffalo for seven years, and about nine years in Detroit. Entered the Institute September, 1865, graduating in 1871, having spent two years (June, 1867, to June, 1869,) in California and Idaho. August, 1871, was in charge of two silver mills at Silver City, Idaho, remaining about two years. In 1873, assistant superintendent and constructing engineer of Oakland reduction works, California, about three years; 1880–82, was superintendent Mack Morris mining company's mill, Globe, Arizona. Has practiced mining engineering, principally as applied

to silver ores; with W. H. Eames, patented a furnace for working finely divided quicksilver ores, in 1874. Since January 1st, 1884, assistant manager Wailuku Plantation, Hawaiian Islands. Wrote an article on the silver deposits of Globe district, Arizona. P. O. address, Wailuku Maui, Hawaiian Islands.

THOMAS MAHLON WILLIAMSON, M. E., son of Passmore and Mercie K. (Taylor) Williamson, was born in Philadelphia, Pa., December 30th, 1850. Prepared at private high school, Caleb Hallowell, principal, Philadelphia, and entered the Institute September, 1867. July, 1871, was rodman and assistant engineer Behnett's Branch extension Allegheny Valley railroad, Jefferson county, Pa.; March, 1872, engineer in charge of mines, Grand Tower mining, manufacturing and transportation company, Grand Tower, Ill.; March, 1874, was made superintendent of same company, and in February, 1882, superintendent Grand Tower department of St. Louis ore and steel company, successor to the first-named company. October, 1883, president and superintendent Grand Tower & Carbondale railroad company. Resigned in 1885. In summer of 1886, purchasing agent in the Northwest. P. O. address, Philadelphia, Pa.

CLASS OF 1872.

WILLIAM AUGUSTIN AIKEN, A. M., C. E., (Baltimore, Md.,) son of William Edward Augustin and Rebecca Josephine (Nicholson) Aiken, was born in Baltimore, Md.. August 28th, 1851. Received the degree of B. A. at Loyola College, Baltimore, Md., June, 1869, after a seven years' course at that institution, and entered the Institute September, 1869, in Division C. After graduation, was on Western Maryland railroad, at Baltimore, and Pennsylvania railroad at Pittsburgh, Pa., until April, 1873; from that time to April, 1876, with San Joaquin & Kings river canal company, Central Pacific railroad; Golden Gate park, San Francisco; North Pacific Coast, N. G. railroad, and city of San Francisco water surveys, as assistant engineer on location and construction. From 1876 to 1879, mining in White Pine county, Nevada; from 1879 to 1883, member of the Clarke

Bridge company, Baltimore, Md. Since then and at present, in Augusta, Ga., as consulting engineer and contractor. As a member of the Clarke Bridge company, was in charge of the erection of all the work built by that company during three years, from October, 1880, to June, 1883, principally in South Atlantic States, along the Atlantic coast line of railroads, notably the large iron bridge on the Charleston & Savannah railroad over the Savannah river. Received the degree of A. M. from Loyola College, 1872. Married, January 26th, 1881, Jean M. Drees, daughter of T. Drees. One child. P. O. address, Room 14, Library Building, Augusta, Ga.

JOHN F. ALDEN, C. E., son of Sidney and Harriet N. Alden, was born in Cohoes, Albany county, N. Y., March 19th, 1852. He entered the Institute in September, 1868, and commenced the day after graduation as assistant engineer upon bridges over the Hudson river at Albany, then being built by the New York Central & Hudson River and Boston & Albany railroads, or under a company known as the Hudson River Bridge company. He remained at Albany after the completion of these two river bridges as an assistant, designing bridge work until January 1st, 1874; then went to Rochester, N. Y., as assistant engineer to Leighton Bridge and Iron Works. February 10th, 1877, he was admitted as a partner in this company, at the same time acting as their engineer. July 19, 1882, leased the Leighton Bridge and Iron Works, with Mr. Lassig, of Chicago, and formed the present partnership of Alden & Lassig, bridge builders and contractors. January 1st, 1882, built new bridge works at Chicago, Ills., which is conducted under the firm name of Lassig & Alden, the Rochester works still being managed under the name of Alden & Lassig; capacity of Rochester works being 12,000 tons of finished bridge work per year, and Chicago works 15,000. The number of bridges, roofs and iron structures built and designed during the past twelve years includes some of the prominent structures upon our leading railroads, also a large number of bridges for the New York Central & Hudson River railroad; the iron work involved in the elevation of their tracks through the city of Rochester; many spans upon the Boston & Albany, Boston & Lowell, Boston & Maine and Connecticut river railroads, including their high bridge over the Connecticut

river at Bellows Falls; New York, West Shore & Buffalo, Delaware, Lackawana & Western and Chicago, Rock Island & Pacific railroads. P. O. address, Rochester, N. Y.

GEORGE BURNHAM, JR., C. E., (Philadelphia, Pa.,) son of George and Anna (Hemple) Burnham, was born in Philadelphia, Pa., November 30th, 1849. Prepared at private schools and entered the Institute September, 1868. In the fall of 1872 entered the service of the Pennsylvania railroad company, as rodman, on a branch road from Williamsburgh to Springfield, in Blair county, leaving this road in the summer of 1873. In the spring of 1875 was appointed levelman on the "Bridge Division" of Bound Brook & North Pennsylvania railroad, remaining for one year, and assisting in the surveys for and final execution of the bridge across the Delaware river at Yardley. In the spring of 1876 formed partnership with Nelson Stow, of Binghamton, N. Y., for the manufacture of the Stow flexible shaft, under style of Stow & Burnham, afterward "The Stow Flexible Shaft company, limited," of which he became secretary and treasurer. In September, 1880, entered the Baldwin locomotive works, as assistant in the purchasing department. Is a member of the American Society of Civil Engineers, Rensselaer Society of Engineers, and of the Engineers' Club of Philadelphia. April 4th, 1881, married Anna Gilpin Lewis, daughter of Enoch Lewis, of Philadelphia. One child. P. O. address, 214 North 34th street, Philadelphia, Pa.

WILLIAM HUBERT BURR, C. E. *See Professors, page 161.* P. O. address, Phœnixville, Pa.

WILLIAM LEE CHURCH, C. E., (New York city) son of Simeon and Sophia (Buel) Church, was born in Hamilton, Madison county, N. Y., March 25th, 1850. No special preparation for the Institute. Practiced land surveying for two years, and was for one year assistant in chemical laboratory at Madison University, Hamilton, N. Y. He entered the Institute in 1868. From July to October, 1872, draftsman for Ludlow valve manufacturing company, Troy, N. Y.; October, 1872, to March, 1874, instructor in mechanical engineering, Lehigh University, Bethlehem, Pa.; March to December, 1874, draftsman Lehigh Valley railroad, Easton, Pa.; December, 1874, to February, 1876, superintendent

Ludlow valve manufacturing company, Troy, N. Y.; February, 1876, to February, 1878, mechanical engineer, Troy, N. Y.; February, 1878, to January, 1881, general eastern agent and engineer Buckeye engine company, New York city; January, 1881, to January, 1882, engineer Hartford engineering company, Hartford, Conn.; January, 1882, to date, general agent Westinghouse machine company, Pittsburgh, Pa. Member of the American Society of Mechanical Engineers. Married, October 9th, 1872, Sarah M. Beckwith, daughter of Edgar Beckwith, of Troy, N. Y. Two children. P. O. address, 25th street, Pittsburgh, Pa.

FREDERICO GARCIA Y GARCIA, (Lima, Peru,) son of Don Jose Antonio and Dona (Josefa) Garcia, was born in Lima, Peru, S. A., August 6th, 1850. From April, 1865, to June, 1868, attended the Collegiate and Commercial Institute, New Haven, Conn., and entered the Institute in September, 1868. In 1873 appointed assistant engineer to commission sent by government of Peru to verify Captain Selfridge's survey for an interoceanic canal route on the Isthmus of Panama. Assistant engineer Piura, Peru, irrigation surveys, etc. Resident engineer Iquique railroad, Peru, and member of corps of engineers, Peru, until 1880. In 1881–83, manufacturer of knit underwear in Lansingburgh, Rensselaer county, N. Y. Married, March 4th, 1874, Anna V. Bilbrough, daughter of Samuel Bilbrough, Cohoes, N. Y. Four children. P. O. address, Lansingburgh, Rensselaer county, N. Y.

HARVEY MOSHER GEER, C. E., son of Gilbert and Francis A. (Mosher) Geer, was born at Troy, N. Y., February 22d, 1851. Prepared at Troy High School, and entered the Institute September, 1868. Commenced the practice of engineering August 1st, 1872, as assistant engineer of Troy & West Troy Bridge company, remaining upon that work until February, 1874; then resigned to engage in building a double stone arch bridge for the city of Troy, over the Poestenkill, on the line of Third street, having contracted for the same as one of the firm of Donaldson & Geer, completing this work in November, 1874. Spent the winter of 1874–75 in Florida; returned to Troy the following spring and entered employ of Earl & Wilson, collar manufacturers, remaining in various capacities about nine

months. In the summer of 1876, was assistant engineer to D. M. Greene, C. E., in topographical and contour survey of the Piscawenkill Valley, made with a view to determine the most desirable location for proposed storage reservoir for Troy, N. Y., water works. In fall of 1876, constructed sewer in Hutton street, Troy, N. Y., as contractor, of the firm of Broderick & Geer. In the fall of 1877, as one of the firm of Donaldson & Geer, contracted for the entire construction of the water works for Johnstown, N. Y., and successfully completed them in the fall of 1878. Immediately entered the employ of Troy water works commissioners, and remained as principal assistant engineer, during the enlargement of those works, until April, 1880. when he was engaged by R. D. Wood & Co., of Philadelphia, Pa., and while in their service as superintendent of construction commenced and completed a system of water works at Fairhaven, Vt., an extension to the water works at Westboro, Mass., and a part of the works at Macon, Ga. February to December, 1881, was engaged with R. R. Osgood, of Troy, N. Y., engaged in the draughting and erecting of his "Boom" dredges. In December, 1881, accepted of the Louisville & Nashville railroad company the position of resident engineer of the Henderson bridge across the Ohio river, but resigned without service in January, 1882, to engage in the manufacture of paper at Ballston, N. Y., where he has since remained. During six weeks of the vacation of 1871, was in the employ of Reuben Comins, of Troy, N. Y., framing and erecting Howe bridges on the Auburn extension of the New York & Oswego Midland railroad and the Philadelphia & Morristown railroad, both in New York State. Member Troy Scientific Association and Engineers' Club of Philadelphia. Married, September 19th, 1878, Caroline Ross Akin, daughter of De Witt Akin, of Johnstown, N. Y. Two children. P. O. address, Ballston, N. Y.

GEORGE HENRY LEA, C. E., (Philadelphia, Pa.,) son of Matthew Carey and Elizabeth (Jauden) Lea, was born in Philadelphia, Pa., June 9th, 1853. Prepared at Springside Academy, Pittsfield, Mass., and entered the Institute in September, 1869. He entered the employ of Messrs. Wm. Sellers & Co., Philadelphia, under instructions as an apprentice, remaining two years, after which was one year in the office of Peter Wright &

Sons, general merchants, Philadelphia, Pa. In November, 1875, he entered the firm of Welsh & Lea, for the manufacture of bolts, nuts and small iron forgings. Married, June 10th, 1879, Alice Van Antwerp, daughter of Louis Van Antwerp, of Cincinnati, O. Two children. P. O. address, 145 Columbia avenue, Philadelphia.

GRAHAM MACFARLANE, (Towanda, Pa.,) son of James and Mary (Overton) Macfarlane, was born in Towanda, Bradford county, Pa., September 24th, 1853. Prepared at the Susquehanna Collegiate Institute, Towanda, Pa., and entered the Institute in September, 1868. He commenced the practice of his profession in July, 1872, as assistant engineer Corning, Cowanesque & Antrim railroad; October, 1872, mining engineer Fall Brook coal company, Antrim, Pa.; September, 1874, engineer and superintendent Buffalo coal company, Clermont, Pa.; January, 1880, superintendent Long Valley coal company, Towanda, Pa.; November, 1881, general manager Winifrede railroad company and Winifrede coal company, Winifrede, W. Va.; January, 1883, president and manager Macfarlane coal company, Charleston, W. Va. Designed and built two railroads and five collieries. He makes a specialty of economic reports on bituminous coal properties, and acts occasionally as consulting engineer on coal mining questions. P. O. address, Charleston, Kanawha county, W. Va.

ELIAS PLUM MANN, C. E. *See Trustees, page 113.*

WILLIAM MARLING, C. E., (Halifax, N. S.,) was born in Toronto, C. W., August 2d, 1846. Has practiced his profession, and for a time was engaged on the Intercolonial railway, Moncton, N. B.

DAVID REEVES, C. E., (Philadelphia, Pa.,) son of Samuel J. and Margaret (Handy) Reeves, was born in Philadelphia, Pa., March 27th, 1852. Prepared at Classical Institute of Philadelphia, and entered the Institute September, 1868. Entered the firm of Clarke, Reeves & Co., bridge builders, prior to leaving the Institute, of which firm he is still a member. Elected president of Phœnix iron company, December, 1878. Is a member of the American Society of Civil Engineers and of the Engineers'

Club of Philadelphia. November 15th, 1875, married Elise C. Fisher, daughter of James C. Fisher. Three children. P. O. address, 410 Walnut street, Philadelphia, Pa.

WILLIAM BRADFORD SHERMAN, C. E., son of Abner and Abby W. (Durfee) Sherman, was born in New Bedford, Bristol county, Mass., September 7th, 1848. Entered the Institute September, 1868. August, 1872, engineer on Callao, Lima & Oroya railroad, Peru, ten months; 1873, practiced civil and hydraulic engineering, Fall River, Mass.; 1874–75, assistant engineer Fall River water works; 1876, general engineer, New Bedford, Mass.; 1877–81, superintendent water works, New Bedford, Mass.; 1881 to date, with Corliss steam engine company, Providence, R. I., first two years as hydraulic engineer, then elected secretary, which position he now holds. Member American Water Works Association and New England Water Works Association. September 23d, 1879, married Rose L. Cook, daughter of T. D. Cook. Two children. P. O. address, Providence, R. I.

ELLERY STOWELL, C. E., (Cooperstown, N. Y.,) son of Leverett C. and Abbey C. (Cory) Stowell, was born in New York city, January 7th, 1852. Prepared at M. W. Lyons' Collegiate Institute, New York city. and entered the Institute September, 1868. Entered upon the work of his profession August, 1872, as assistant engineer on the Troy and West Troy bridge; November, 1872, assistant engineer Rochester & State Line railroad, stationed at Eagle Village, Wyoming county, N. Y.; April, 1874, to January, 1878, in the office of the proprietors of locks and canals on Merrimac river, Lowell, Mass.; May, 1878, to May, 1879, Lancaster mills, Clinton, Mass.; June, 1879, to date, located at Leadville, Col., as United States deputy mineral surveyor. P. O. address, Box 1280, Leadville, Col.

ALEXANDER JOSEPH SWIFT, A. M., C. E., (New Brunswick, N. J.,) son of McKee and A. H. Swift, was born in Newburgh, N. Y., August 20th, 1849. Prepared at Rutger's College, New Brunswick, N. J., and entered the Institute in September, 1869. Entered upon the work of his profession in August, 1872, as assistant engineer Troy & West Troy bridge company, Troy, N. Y.; assistant engineer C. D. & M. railroad, Dubuque, Iowa; assistant engineer Leighton bridge and iron works, Rochester,

N. Y.; assistant engineer Delaware bridge company, New York city; assistant engineer S. P. railroad, Arizona; assistant engineer United States engineering department in charge Wilmington harbor, Cal. Received degrees of B. A. and M. A. from Rutger's College, N. J. Chief engineer Delaware & Hudson Canal Company. P. O. address, Albany, N. Y.

ALFRED WALTER, C. E., (New York city,) son of Ellwood and Elizabeth H. (Bourne) Walter, was born in Brooklyn, Kings county, N. Y., October 2d, 1851. Prepared at Prof. Wm. C. Richard's school, Pittsfield, Mass., and entered the Institute in September, 1868. July, 1872, appointed rodman of the engineer corps on Bennett's Branch extension, Allegheny Valley railroad; assistant engineer in January, 1873; resigned January, 1874; September. 1874, was appointed assistant supervisor New York division Pennsylvania railroad; transferred to Altoona October, 1874; then to Baltimore in November, 1874. Appointed supervisor Baltimore division Northern Central railway, May, 1875; assistant engineer Baltimore division Northern Central railway, Baltimore & Potomac and Fredericksburgh railroads May, 1878; transferred to Altoona as assistant engineer motive power department Pennsylvania railroad, December, 1881; appointed superintendent Sunbury division Pennsylvania railroad and Shamokin division Northern Central railroad, which position he now holds. P. O. address, Sunbury, Northumberland county, Pa.

JONAS FRANCIS YOUNG, C. E., son of James and Lydia (Hittel) Young, was born at Niagara Falls, Niagara county, N. Y., August 30th, 1847. Prepared by Col. Johnson, C. S. A., Niagara Falls, and entered the Institute September, 1868. Entered upon the work of his profession June, 1871; in Pennsylvania two years, New York four months, and West Virginia three months. Since 1873, general land surveying, Niagara county, N. Y. Was employed on Punxsutawney & Brockwayville division, Rochester & Pittsburgh railroad; also resident engineer Ohio & Guyandotte railroad, W. Va. Member of Rensselaer Society of Engineers. P. O. address, Niagara Falls, N. Y.

CLASS OF 1873.

ARTHUR LATHAM BAKER, C. E., (West Lebanon, N. H.,) son of John G. and Mary A. (Latham) Baker, was born in Cincinnati, O., May 7th, 1853. Entered the Institute September, 1869. Was adjunct professor of civil engineering at Lafayette College, Easton, Pa., 1873 to 1880; since then attorney and counselor at law, Scranton, Pa. Married, September 26th, 1878, Bessie Cort Hand, daughter of Aaron H. Hand, D. D. P. O. address, Scranton, Pa.

JAMES E. BELL, C. E., was born in Cincinnati, O., December 28th, 1849. His grandfather was a captain in the British army, who came to America in 1812, just before the declaration of war. He first settled in Lancaster, Pa., but in 1817 he removed to Cincinnati, and with the exception of a four years' residence at Rising Sun, Ind., he continued to be a citizen of Cincinnati until his death. His father, Joseph Bell, Esq., has long resided in Cincinnati, where he is in charge of an extensive foundry and machine shop. James E. Bell received his early education in the common schools of Cincinnati, and finished his course at the Woodward High School in June, 1869. In September of that year he entered the Institute. He was thus careful to prepare himself by special study in the best schools, and did not assume the title of engineer until his diploma gave him the right to use it. The success which at the time of his early death had already attended his efforts in his chosen profession, was largely due to his excellent training, by means of which he was soon able to erect a stable edifice of practice on a broad foundation of the fundamental principles of mechanics and engineering. Ambitious to excel, and desirous of speedily acquiring experience in practical construction, he sought and obtained service during his vacations, as an assistant to John C. Wilson, C. E., engineer in charge of the erection of the Newport and Cincinnati railroad bridge over the Ohio river.

After leaving Troy, Mr. Bell was employed for about three months on surveys connected with the location of the Cincinnati Southern railroad, under the direction of the chief engineer, Mr. William A. Gunn. For nearly a year longer he had charge

of a party engaged between Dayton and Springfield, O., in resurveying a route for the C. C. C. & I. railroad (Dayton short line or bee line). In July, 1844, he took service under Col. W. E. Morrill, United States engineer, and made a survey of the Big Sandy river from its mouth to Warfield, Ky., on the Tug Fork, and to Pikton, Ky., on the Louisa Fork. In 1875, in obedience to an act of Congress, this survey was extended up the Louisa Fork to the mouth of Divided Creek in Virginia. This second survey was also made by Mr. Bell. In November, 1875, he was assigned to duty at Hoard's Rock, W. Va., on the Monongahela, below Morgantown, with orders to continue the work of building a masonry lock and dam at that paint. He remained on this duty until November, 1876, when all work was stopped on account of the exhaustion of the appropriation. In June, 1877, Mr. Bell was put in charge of the improvement of the Little Kanawha river, and he remained on this duty until work was stopped by cold weather. This was his last service under the government. His reports on the Big Sandy, and his reports of operations on the Monongahela and on the Little Kanawha, will be found in full in the annual reports of the chief of engineers. On the 10th of July, 1878, he received from the Board of Public Works of the city of Cincinnati the appointment of superintendent of the city water works. He filled this important and responsible position with great acceptance until his death, on the 8th of June, 1879, at the early age of twenty nine. He succumbed to an attack of inflammation of the bowels. He left a widow, but no children, having been married but little more than a year. He was elected a member of the American Society of Civil Engineers March 5th, 1879.

Of a genial disposition, his business relations were always pleasant, but his kindness of heart never caused a relaxation of official vigilance. Sternly honest himself, and animated by a keen sense of duty, shirking contractors found no weak spots that would excuse them from a complete and exact performance of their engagements. Full of zeal for his profession, with the best available training and an increasing experience; and already the incumbent of one of the highest professional positions in his native city, life seemed to present for his acceptance the highest honors of his chosen career. But the destroyer seized the strong man in the vigor of his youth, and in a few short

days his honors had faded, his place had been filled by another, and his memory alone was left to the friends that loved him and had rejoiced in his early success.

ABRAHAM BLUN, B. S., C. E., son of Nathaniel and Wilhelmina Blun, was born in New York city, November, 1852. Prepared at College of the City of New York, and entered the Institute in 1870. In the fall of 1873 he entered the employ of Blun & Co., and became a partner in that firm in 1876. Married, November, 1879, a daughter of Dr. Gutherz, deceased, of Manheim, Germany. One child, who died in December, 1884. He died in August, 1881, at Eaux Bonnes, France.

FREDERICK MONROE BRYANT, C. E., son of Susan (Turner) and Monroe Benjamin Bryant, was born in New York City January 3d, 1853. Prepared at Brooklyn, (N. Y.) Collegiate and Polytechnic Institute, and entered the Institute in September, 1871, Division B, graduating in June, 1873. In the fall of 1873 he commenced practicing his profession with surveying party of N. Y., H. & N. railroad for one year, and then in the fall of 1874 as assistant engineer under W. P. Granger, C. E., on the Hoosac Tunnel railroad, near eastern portal, where, after having been promoted to the charge of a division, he died of diphtheria at North Adams, Mass., January 16th, 1875, aged 22 years.

CHARLES CAMPBELL, C. E., (Ironton, O.,) son of John and Elizabeth (Clarke) Campbell, was born in Ironton, Lawrence county, O., June 8th, 1851. Attended Ironton public schools, and entered the Institute in September, 1869. During the summer of 1882 assisted in the Ohio state survey in the Hanging Rock iron region. Engaged in the coal business since 1876. In 1879, director Ohio iron and coal company; 1876, director, secretary and treasurer Hecla iron and mining company for eight years; 1879, director and president Iron railroad company, for two years; 1880, director and vice-president Charcoal iron company for four years, the principal offices of which are located at Ironton, O. Member of board of managers Charcoal Iron Worker's Association of the United States since its organization. Received silver medal, Cincinnati Exposition managers, for services as their representative on committee of three in testing the Harris, Corliss, and other engines. Was also on

a committee for testing steam draft engines for common roads and streets. Member of American Institute of Mining Engineers, Charcoal Iron Maker's Association of the United States, and Ironton Scientific Society. P. O. address, Ironton, Lawrence county, O.

JOHN HENRY CURTIS, C. E., (Cambridge, N. Y.,) son of William W. and Freelove (Warner) Curtis, was born in White Creek, Washington county, N. Y., April 2d, 1849. After his sixth year, resided on the old Albany northern turnpike, a mile and a half south of Cambridge village. Worked on the farm eight months and attended country school four months of each year, until the age of fifteen, when he attended two terms at Cambridge Washington Academy, entering the Institute February, 1870. Upon graduation, he entered the service of the government of Ecuador, where he served until July, 1876, as principal assistant on government work, for seven months in temporary charge as manager-in-chief. Entered United States engineering service May, 1877, with headquarters at St. Louis; first assistant on survey of Missouri river at Omaha, until August, 1877; first assistant on jetty dike at Fort Smith, Arkansas river, until April 1st, 1878; in charge Fort Smith dike to completion, November, 1878. In charge of surveys and general scientific observations on Arkansas river, at Pine Bluff, Ark., to September, 1879; office work on maps of Wellman survey of Missouri river to January, 1880; division engineer Wisconsin Central railroad, to August, 1880; resigned and re-entered the United States engineer service, in charge of improvement of the Arkansas river from Wichita, Kan., to Fort Smith, Ark., and served until June, 1881; resigned and took charge of location of Denver & Rio Grande railroad, on Upper Colorado river. November, 1881, took charge of location of line from summit of Laurel Hill to Connellsville, thirty-five miles, for the new Southern Pennsylvania railroad company. Resigned, June, 1882, and in September of that year entered the service of the Interoceanic canal company, at Panama, where he still remains. November, 1883, began active work as contractor on the removal of Bohio mountain, for the Interoceanic canal company, at Bohio, Panama, work to be finished within thirty months. Acted as engineer and manager of the Southern railroad of Ecuador, for

seven months. Member of Rensselaer Society of Engineers in 1870. Married, September 7th, 1876, Julia A. Rundell, daughter of D. P. Rundell, of Troy, N. Y. Three children. P. O. address, care of Canal company, Panama, U. S. of Colombia.

JAMES DUANE, C. E., son of James C. and Harriet W. (Brewerton) Duane, was born at West Point, Orange county, N. Y., July 17th, 1852. Prepared at Flushing Institute, Long Island, E. A. Fairchild, principal, and Portland High School, Me., and entered the Institute in February, 1870. July, 1873, to April, 1874, superintendent of construction Fort Preble, Portland harbor; superintendent of construction second light house district to November, 1874; assistant United States engineer, improvement of mouth of the Mississippi river to June, 1875; assistant engineer on survey for new aqueduct, New York city, August, 1875, to June, 1876; superintendent of construction second light house district, February, 1876, to November, 1876; assistant engineer Croton aqueduct department, November, 1876. Built light-houses at Cape Elizabeth, Me., at Race Point, Long Point and Nobsque, Mass.; dwelling houses connected with these, and other light stations; also fog signals, engine houses, and beacons at various points; foundations of high service pumping works at 98th street, New York city; 115 miles of water mains of all sizes (about one-fifth of the total amount laid) has been laid under his supervision; also the construction of the submarine pipe for supplying the Worth Brothers, limited. This pipe, 2,000 feet long, is laid in a rapid tide-way. The bottom is very irregular and rocky, and the depth in places exceeds one hundred feet. It is believed that this is the largest undertaking of the kind ever successfully carried out. He is married and has two children.

ARTHUR JOSEPH FRITH, C. E., (New York city,) son of Edward and Emily (Binsse) Frith, was born in Philadelphia, Pa., February 22d, 1852. Prepared at Georgetown College, Georgetown, D. C., and entered the Institute September, 1870. September, 1873, in Bessemer steel works, Troy, N. Y.; May, 1874, assistant professor of mechanical engineering at Lehigh University, Bethlehem, Pa.; December, 1875, with Sanderson Brothers steel company, in charge of steel melting, at Syracuse, N. Y.; June, 1879, United States engineer on improvement of Missouri and

Mississippi rivers. September, 1881, in charge of construction with Mississippi river commission, at Plum Point, Tenn., as principal assistant engineer, and since at Elmot, Arkansas. Member of American Society of Civil Engineers. P. O. address, 3833 Delanor Avenue, St. Louis, Mo.

CHARLES POND HARRIS, C. E., (Rutland, Vt.,) son of Joel Benedict and Susan Melicent (Pond) Harris, was born in Springfield, Hampden county, Mass., July 2d, 1852. Prepared at Rutland, Vt., High School, and entered the Institute September, 1869. Traveled in Europe July, 1873, to February, 1874. April, 1874, in business at Rutland, Vt.. as manufacturer of doors, sash and blinds, and lumber dealer. In 1880, began the manufacture of cane seat chairs, under the name of Charles P. Harris manufacturing company, which has since been consolidated with the Rutland foundry and machine shop company, and duly incorporated. Married, June 18th, 1879, Charlotte Metcalf Sessions, of Springfield, Mass. P. O. address, Rutland, Vt.

JOHN GILBERT HUMPHREYS, C. E., son of John and Sarah E. (Gilbert) Humphreys, was born at Chicopee Falls, Hampden county, Mass., April 17th, 1849. Resided at Chicopee Falls, and attended the High School. Moved to Hartford, Conn., before his graduation. Had no special preparation except what he gave himself after deciding to enter the Institute. Entered in 1869. Entered the service of the Atlantic & Great Western railroad company as assistant engineer in the summer of 1873. Was located at Youngstown, Ohio, to inspect the iron work produced there for railroad company, and to make a special study of the processes employed in the manufacture of iron, for the purpose of becoming an expert in this branch for the benefit of the company. He left this position in May, 1874, returning to his home at Hartford, Conn., where he became connected, as an assistant, with the survey of the West Hartford water works, but he became broken in health, failing gradually, and died January 6th, 1876.

NORMAN BENJAMIN KELLOGG, C. E., son of Charles and Jane (Burnell) Kellogg, was born in White Pigeon, St. Joseph county, Mich., October 18th, 1843. Preparation for the Institute was made principally by private study, his occupation being that of

a farmer. He entered the Institute in October, 1869. During his course at the Institute, was employed at intervals as assistant in surveying. In August, 1873, with engineer corps of Atlantic & Great Western railroad as assistant to constructing engineer for one year. Was subsequently employed by the Pennsylvania bridge company on work of foundation. In December, 1874, he went to California, and in March following joined an engineering party in surveys for a narrow gauge railroad, remaining until fall. In the spring of 1876 entered the service of the Central Pacific railroad company, acting in various positions, as draughtsman, transitman, etc., for three years, when he was transferred to the Southern Pacific railroad, acting in similar capacities for one year; then as assistant to constructing engineer for three and one-half years. In July, 1883, transferred to department of maintenance of way, Central Pacific railroad, as division roadmaster. Junior member of the American Society of Civil Engineers, February, 1878. P. O. address, West Oakland, Alameda county, Cal.

THOMAS JOHN LONG, C. E., (New York city,) son of Jacob A. and Isabella R. (McBride) Long, was born in New York city, January 20th, 1852. Prepared at the University of the city of New York, engineering course, and entered the Institute February, 1870. In July, 1873, commenced the practice of his profession on Atlantic & Great Western railroad, remaining there nine months; October, 1874, became connected with the department of docks, New York city, as assistant engineer; 1886, assistant engineer Morse bridge company, Youngstown, Ohio. Member of American Society of Civil Engineers. Married, Januarv 11th, 1882, Ada Louise Badeau, daughter of E. C. Badeau. Wife died June 29th, 1883. P. O. address, Youngstown, O.

MANUEL ALONSO PELAEZ, A. B., C. E., (Havana, Cuba,) son of Juan A. and Andrea de la Luz Abreu Pelaez, was born in Havana, Cuba, March 25th, 1849. Prepared in the Institute of Havana, taking the degree of A. B., and entered the Institute September, 1867, in Division C; went to Cuba in January, 1869, and returned to the Institute in January, 1871, joining Division B. From January to March, 1875, did some office work, drawing and calculation, in New York city, for the Antioquia railroad in Colombia, S. A. In 1879, surveyed and made plans for

a cattle ranch of about 300 acres. In 1879–80, assistant engineer for Havana gaslight company, for five months; during this time made surveys, did field and office work, calculations, &c,, for a railroad and wharf. With same company from February, 1881, to June. In May, 1882, with another engineer, made surveys and calculations for a railroad branch on a sugar plantation named San Antonio. In May, 1883, another railroad branch for the sugar plantation, named Santa Rosa. Since January, 1884, assistant engineer of the S. A. L. & P. Co., Havana. P. O. address, Aguila 72, Havana, Cuba.

BENJAMIN WALKER PETERSON, A. M., C. E., (Wheeling, W. Va.,) son of William F. and Sarah (Gibson) Peterson, was born in Wheeling, Ohio county, W. Va., October 26th, 1851. Prepared at Bethany College, Bethany, W. Va., and graduated as A. B. Entered the Institute, Division C, fall term of 1870. After graduation, was for a few months assistant to the city engineer; in February, 1875, was appointed city engineer of Wheeling, and held the office six years. In 1881, made preliminary survey for Wheeling, Parkersburg & Charlestown railroad, for about 120 miles. 1881–82, made survey and location for the bridge over the Ohio river at Wheeling, for the Wheeling & Lake Erie railroad, which plans were acceptsd and adopted by the Government and the company. Since May, 1882, has been engaged with S. P. railroad as resident engineer. In January, 1884, was appointed engineer of Wheeling & Harrisburg railroad, and the bridge over the Ohio river at Wheeling, W. Va. Received the degree of A. M. from Bethany College. P. O. address, Wheeling. W. Va.

JAMES REED, Ph. B., C. E., (Pittsburgh Pa.,) son of James Ramsey and Rebecca (McKean) Reed, was born in Pittsburgh, Pa., May 8th, 1852. Was graduated from Western University of Pennsylvania, Pittsburgh, Pa., June, 1870. He had about two month's experience on city engineer corps of Pittsburgh, summer of 1870, before entering the Institute, in September, 1870. Entered the service of the Pennsylvania railroad company in June, 1873, as transitman on topographical survey at Walls Station, and in a few months was promoted to engineer in charge. In December, 1873, the survey being completed, was transferred to the Altoona office. May, 1874, transitman on

railroad survey for a line through Westmoreland county, Pa.; September 1st, 1874, appointed assistant superintendent division No. 1, with headquarters at Philadelphia; January 1st, promoted to supervisor of division No. 3; July, 1876, promoted to assistant engineer Tyrone division, with headquarters at Tyrone, Pa.; August 1st, 1879, assistant engineer Pittsburgh division; June 1st, 1881, principal assistant engineer Pennsylvania railroad division; October 1st, 1882, superintendent Altoona division Pennsylvania railroad; superintendent of Schuylkill Valley division of Pennsylvania railroad. Received degree of Ph. B. from Western University of Pennsylvania. Married, October 17th, 1877, Alice Hutchinson. Two children. P. O. address, Pennsylvania railroad office, Philadelphia, Pa.

WILLIAM HANDY REEVES, C. E., son of Samuel James and Margaret A. (Handy) Reeves, was born in Philadelphia, Pa., February 1st, 1854. Prepared at Dr. John W. Faire's Classical Institute, Philadelphia, Pa., and entered the Institute in September, 1869. After graduation, traveled in Europe for a time, and then became connected with the Phœnix iron company, of which he is now assistant superintendent. P. O. address, Phœnixville, Pa.

PEDRO JOSE SOSA, C. E., was born in Panama, S. A., May 19th, 1851. Chief of technical control and topographical department of the Panama canal. P. O. address, Panama, United States of Colombia, S. A.

THEODORE STEINACKER, C. E., was born in St. Louis, Mo., in May, 1853. Civil engineer, St. Joseph, Mo.

DANIEL AUGUSTUS TOMPKINS, C. E., son of D. C. and Hannah Virginia (Smyly) Tompkins, was born at Meeting Street P. O., Edgefield county, S. C., October 12th, 1852. Attended country school and South Carolina College. Entered the Institute in 1869. In 1870–73, during vacation, at Bessemer steel works, Troy, N. Y.; 1873–74, draughtsman for A. L. Holly, consulting engineer, Brooklyn, N. Y.; 1874–79, machinist, head draughtsman, etc., for Bethlehem iron works, Bethlehem, Pa.; 1879–1881, constructing engineer Menden & Schwerle, *Eisen Industrie*, Schwerle, Germany; 1881–83, master mechanic Crystal plate

glass works, Crystal city, Mo.; 1883, member of the firm of D. A. Tompkins & Co., Charlotte, N. C., furnishers of steam power and consulting engineers. Under his charge the rolling mill for Menden & Schwerle, *Eisen Industrie*, was built. Engaged in general engineering work at Charlotte, for Charlotte oil company; Piedmont manufacturing company, Grenville, S. C.; Clifton manufacturing company, Clifton, S. C.; Rock Hill mining company, Rock Hill, S. C., etc. At present agent of Westinghouse machine company. P. O. address, Pittsburgh, Pa.

HERMAN VOORHEES, C. E., (New York city,) son of R. T. and Margaret Sinclair Voorhees, was born near Ramsgate, Kent, England, the home of his maternal grandfather, August 18th, 1852. The family soon returned to this country, and after spending six years in San Francisco, Cal., settled in New York city. Their two sons attended the school of Mr. George Anthon. "Herman was by nature slow, contemplative, and averse to exertion, yet his intense desire for knowledge for its own sake, and his inborn love for scientific pursuits, led him to form habits of unceasing industry. In his seventh year, having seen nothing better than a marble mantelpiece, he conceived the idea of a bas relief. Before he was nine, he had made his first microscope out of a tin can, and before he was eleven, he said 'what I want to understand is the nature of things.' The steam engine, the turning lathe, the microscope, occupied every spare moment of his time. A threatened failure of eyesight was the consequence of all this work, and in his fourteenth year he was obliged to take a long sea voyage to Rio de Janeiro and back. On his return, books being forbidden, he entered the School of Mines of Columbia College, under Professor Chandler, who kindly admitted him as an outside pupil, he being too young to enter in the usual manner. In 1868, being then about fifteen, he accompanied a portion of his family to London, where he immediately devoted himself to the study of whatever was most valuable within his reach. He first gave a fortnight to the minerals in the British Museum, and then entered himself as a student of chemistry in the London University. His object was merely to become acquainted with the apparatus and mode of working in that institution, and this he attained. He likewise attended the scientific lectures at the Royal Institution, and

gave some time to the geological museum in Jermyn street, and then went to Scotland and made a hasty tour in the highlands. In New York his second great disappointment awaited him, for a sudden and disastrous change in his father's fortunes made it impossible for him to enter college. He spent the winter in Troy with his elder brother, likewise attending the High School, and entered the Institute in the fall of 1869. His original bent was undoubtedly towards physics, but various influences induced him to choose chemistry for his life work. He was in no hurry however, to shorten the time due to preparation, often quoting the words of Milton: 'I care not if I do not enter life till thirty, so I enter it fit.' After graduation, he remained at home in New York studying German and physiology. In the spring of 1874 he became tutor to the son of the late Dr. Swift, of Syracuse, and in 1875 he was at length enabled to fulfil his long cherished project of going to a German University. Under the advice of Professor Nason, of Troy, and furnished by him with credentials, he went to Göttingen; and judging from his letters to his friends, his residence there must have been delighful as well as profitable to him. A short vacation tour which he made at the end of the first semester, resulted disastrously, for he brought back from Rome the seeds of the malarial fever which was ultimately fatal to him, and he found, on his return to Göttingen, the sad news that his father had died of yellow fever in Rio de Janeiro, so that all his plans of study were destroyed once more. Returning home immediately, he was appointed assistant in geodesy and descriptive geometry in the Institute, which position he held for two years. In 1878, however, he once more saw his way to the entire devotion of his time to study, and for this purpose entered the Johns Hopkins University in Baltimore. Nine months passed away in ardent study, congenial society, and every advantage a student could desire. But overwork and anxiety had told on a constitution enfeebled by malaria. On the 16th day of May, 1879, he was seized with hemorrhage of the lungs while in the laboratory. He passed the summer in the Adirondacks, but his strength slowly failed and he died at Ballston, N. Y., at the home of his brother, October 14th, 1879, having borne his illness with entire calmness and fortitude, being just twenty-seven, and having been chosen a fellow of Johns Hopkins University, so that this first step was gained in

the career for which he had been so long and so laboriously preparing himself."

THOMAS CHESTER WALBRIDGE, C. E., (Saratoga, N. Y.,) son of Henry T. and Margaret E. (Knickerbacker) Walbridge, was born in Lansingburgh, Rensselaer county, N. Y., May 9th. 1851. Prepared at Lawrenceville Classical and Commercial High School, Lawrenceville, Mercer county, N. J., and entered the Institute in 1869. In November, 1882, was appointed teller First National Bank, Tamaqua, Pa. Married, June 9th, 1881, Anne E. Carter, daughter of William T. Carter, of Philadelphia, Pa. One child. P. O. address, Tamaqua, Schuylkill county, Pa.

CLASS OF 1874.

JAMES NELSON CALDWELL, JR., C. E., (Carthage, O.,) son of Col. James Nelson and Cornelia A. (Boardman) Caldwell, was born in Dayton, Montgomery county, O., February 20th, 1852. Prepared at Chickering Classical and Scientific Institute, Cincinnati, O., and entered the Institute in September, 1870. Entered upon the practice of his profession in August, 1874, as assistant to Gen. Godfrey Weitzel, major of engineers, U. S. A., on harbor of refuge, Sand Beach, Mich., remaining three months ; draughtsman in department of construction, Cincinnati Southern railroad, for three months, beginning April 1st, 1875 ; assistant engineer improvement of Mississippi river for four months, beginning September 1st, 1876 ; assistant engineer in charge of improvement of Guyandotte river, W. Va., for five and one-half months, beginning July 15th, 1878 ; assistant engineer in charge of improvement of Ohio river during seasons of 1879–80 and 1881. Professor of mathematics and natural science in Chickering Classical and Scientific Institute, Cincinnati, O., since February 1st, 1882. Married, September 5th, 1885, Stella Ross, daughter of E. H. Ross, deceased, of Cincinnati, O. One child. P. O. address, Carthage, Hamilton county, O.

GEORGE WHEELER CARNRICK, C. E., (Troy, N. Y..) son of Edmund and Maryette (Carnrick) Wheeler, was born in Poestenkill, Rensselaer county, N. Y., February 19th, 1852. His mother

dying when he was but eight months old, he was adopted by his uncle, Peter Carnrick, and took his name. Prepared at the Troy High School, and entered the Institute in 1870. In 1874, commenced work under Lieut. Willard, United States engineer corps, making observations on the velocity of current, volume, tides, &c., of Hudson river. 1875, went to Plattsburgh as transitman on location of New York & Canada railroad, from Plattsburgh to Rouse's Point. 1876, employed on survey of New York State canals. 1877, in charge of improvement of a portion of Hudson river. Resigned in October and went into business with Cooper & Co., Troy, N. Y., ice and coal. Married, October 22d, 1877, Ella Akin, daughter of Robert Akin. One child. P. O. address, Troy, N. Y.

LYMAN EDGAR COOLEY, C. E., (Canandaigua, N. Y.,) son of Albert Blake and Acksah (Griswold) Cooley, was born in Canandaigua, Ontario county, N. Y., December 5th, 1850. Prepared at Canandaigua Academy. Resided on a farm, and labored there during vacations until entering his profession. During two years, 1870–72, had charge of primary department of Canandaigua Academy, two terms, and of intermediate department four terms. Was in charge of gymnasium four years, ending 1872. He entered the Institute in 1872, and after graduation was employed as professor in charge of engineering department at Northwestern University, Evanston, Ills., for three years. In the summer of 1876, associate editor of *Engineering News*, Chicago, until May, 1878; then assistant to Gen. William Sooysmith, resigning in August to accept appointment from Major Suter as assistant engineer in charge of government surveys and improvement at Nebraska City, Nev. In 1879 organized a party to make physical observation at Plum Point and Fulton Reaches of the Mississippi river, under the low water board of United States engineer corps. He returned to Nebraska City in 1879, there continuing in charge until the summer of 1880, when he was transferred to St. Charles, Mo., remaining there until April, 1882, when he assumed the duties of chief assistant Missouri river improvement in the St. Louis office; assistant engineer on Glasgow bridge, and on its design; also designed and built river works at Nebraska City and St. Charles, Mo. In 1883 the design and construction of $400,000 worth of plant for the Missouri river improvement was largely under his

supervision. In 1886, assistant to Rudolph Hering on the sewerage of Chicago, Ill. Member of the Rensselaer Society of Engineers, Troy, N. Y., and of the Western Society of Engineers, Chicago, Ill. Married, December, 31st, 1874, Lucena McMillan, daughter of P. H. McMillan, of Canandaigua, N. Y. Two children; one living. P. O. address, Chicago, Ill.

WILLIAM JOHNSTON FABIAN, C. E., (Lake Forrest, Ill.,) son of Robert L. and Emily S. (Johnston) Fabian, was born in Cincinnati, Hamilton county, O., July 27th, 1852. Graduated at Lake Forest Academy, and entered Williams College July, 1869. Pursued mathematical and linguistic studies under tutors at Versailles, France; Dresden, Saxony; Zurich, Switzerland; and London, England; from July, 1868, to September, 1871, when he entered the Institute. Engaged upon United States improvement Connecticut river, season of 1875; master in mathematics and German at Lake Forest Academy, September, 1876. In real estate business, Chicago, Ill., October, 1877. Chicago, Burlington & Quincy railroad company, supply department, Burlington, Ia., November, 1878; operative department, same road, Burlington, Ia., June, 1879; purchasing department, same road, Chicago, Ill., August, 1881; executor and trustee U. S. Johnson's estate, Chicago, Ill., April, 1882; Chicago, Burlington & Quincy railroad company, treasury department, Chicago, Ill., May, 1884, and now secretary to the vice president. Married, July 7th, 1880, Fanny Storrs Millard, of Utica, N. Y. One child. P. O. address, 209 Adams street, Chicago, Ill.

FRANK L. FORD, C. E., (East Cleveland, O.,) son of Francis and Mercy (Fuller) Ford, was born in Cleveland, Cuyohoga county, O., January 26th, 1853. Prepared at Cleveland High School, and entered the Institute September, 1869. Spent about six months in engineers' department C. C. C. & I. railroad, in 1874–75. March, 1875, at Somerset, Ky., as rodman on Cincinnati Southern railroad; September, 1875, Marion, O., as resident engineer on Columbus railroad, until February, 1876. Has not practiced his profession since; engaged in hardware business in Cleveland, O., May, 1876. Left for Denver, Col., July, 1879; employed as chief clerk Colorado Pool Association; is at present general manager of the Chronicle mining and milling company. Built twelve miles of Columbus & Toledo railroad,

from Delaware to Marion, O. Married, October 3d, 1877, Eva M. Hurlbut. Two children. P. O. address, Pitkin, Gunnison county, Col.

ALEXANDER PURVES GEST, C. E., son of John B. and Elizabeth A. (Purves) Gest, was born in Philadelphia, Pa., February 2d, 1853. Prepared at University of Pennsylvania, department of arts, class of 1872, through junior year, and entered the Institute, division C, in September, 1871. In April, 1875, in employ of Northern Central railroad; September, 1876, with Pennsylvania railroad, and since that date with same road in various positions on construction and maintenance of way; assistant engineer Pittsburgh division, and at present assistant engineer of the New York division, Jersey City, N. J. Member of Engineer's Club, of Philadelphia, Pa. P. O. address, Pennsylvania railroad office, Jersey City, N. J.

GEORGE STEINMAN GRIFFEN, C. E., (Phœnixville, Pa.,) son of John and Mary E. (Leggett) Griffen, was born in Safe Harbor, Lancaster county, Pa., January 11th, 1854. Prepared in the public schools and H. Y. Lauderbuch's academy, and entered the Institute in 1870. He went into the Phœnix iron company's machine shops the fall after graduating, and was under instructions until March, 1876, when he accepted a position as engineer with the Grand Tower mining, manufacturing and transportation company, where he remained until January 1st, 1879, when he became a member of the firm of Griffen, Smith & Hill, manufacturing potters, Phœnixville, Pa. He is still in the same business, with the firm name changed to Griffen, Smith & Co. Secretary and treasurer of the Phœnixville gas light and fuel company since 1879. Member of the bourough council of Phœnixville, Pa., spring of 1883; re-elected in 1884 for three years. Member of American Society of Mining Engineers. P. O. address, Phœnixville, Chester county, Pa.

WILLIAM PITT MASON, C. E., B. S., M. D. *See Professors, page 162.*

HARRY DAUCHY PATTISON, C. E., son of Edward C. and Julia R. (Dauchy) Pattison, was born in Troy, Rensselaer county, N. Y., August 20th, 1852. Prepared at St. John's school, Sing

Sing, N. Y., and entered the Institute in 1871. In 1876 entered upon professional work; was employed on Erie railroad, at Elmira, N. Y.; in 1877, assistant on New York State survey. Since March, 1877, has been engaged in business; since March 1st, 1884, in the office of W. A. Wood mowing and reaping machine company, at Hoosick Falls, N. Y. Postmaster at Hoosick Falls, 1883. P. O. address, Hoosick Falls, N. Y.

WILLIAM HENRY POWLESS, C. E., son of Paul and Sarah J. (Mosher) Powless, was born in Norwood, Bergen county, N. J., June 9th, 1853. Prepared at Englewood (N. J.) Institute, and entered the Institute September, 1870. June to September, 1871, engaged on surveys in vicinity of Englewood, N. J.; June to September, 1873, surveys in same place; June to November, 1874, on boundary survey between Bergen and Hudson counties, New Jersey; November, 1874, to March, 1875, United States assistant engineer in charge of surveys and improvement of Blackwater river, Va.; September, 1875–76, assistant in geodesy, etc., and 1876 to December, 1878, assistant in mechanics, in the Institute; December, 1878, to March, 1884, United States assistant engineer in charge of surveys upon Plum Point and New Madrid reaches, Mississippi river improvement; March, 1884, civil and mining engineer, Alma, Col. 1876–79, draughtsman at Watervliet Arsenal. Since then civil engineer in Colorado. P. O. address, Alma, Park county, Col.

ENRIQUE CORONEL ZEGARRA, C. E., was born in Piura, Peru, May 16th, 1851. At present reported as assistant engineer on the Panama canal, Panama, U. S. Colombia, S. A.

CLASS OF 1875.

ROYAL EDWARD BALL, C. E., (Jamaica, N. Y.,) son of Royal and Martha A. (Harney) Ball, was born in Troy, N. Y., May 6th, 1855. Previous to entering the Institute he resided at Jamaica, N. Y., and attended Union Hall Academy. Entered the Institute in September, 1871. July, 1875, to July, 1876, assistant engineer C. R. R., of U. T.; 1877–78, chemist, New York city; 1879, assayer, Georgia and North Carolina; 1880, assayer, New

Hampshire and New York city; 1881, Metallurgist, Old Jordan mine, Bingham canyon, Utah; 1882, locating engineer, Denver & Rio Grande Western railroad, Utah; 1884, electrician Ball electric light company, New York; principal assistant engineer on construction High Bridge railroad and Longwood Valley railroad division to Denver & Rio Grande Western railroad, 90 miles, located under his direction. P. O. address, 382 Second avenue, New York city.

ADOLFO ELEUTERIO BESOSA, C. E. *See Assistant Professors, page 164.*

HENRY LEON BARCEL BINSSE, C. E., (New York city,) son of Louis Barcel and Mary D. (Carpenter) Binsse, was born in New York city, November 4th, 1852. Prepared at Realschule, Dusseldorf, Prussia, and entered the Institute 1870. Went as a student to the North Chicago rolling mills, 1874; accepted a position as inspector of steel rails in same mill in 1875, and resigned in 1877. After practical studies at Delamater Iron works, New York, became a member of the firm of George A. Ohl & Co., Newark, N, J., mechanical engineers, tool builders, &c. Member of American Society of Mining Engineers, and American Society of Mechanical Engineers. P. O. address, 40 West Ninth street, New York city.

JAMES LAWRENCE BREESE, C. E., son of J. Salisbury and Augusta E. (Lawrence) Breese, was born in New York city, December 21st, 1854. Attended school in Westchester, N. Y., B. T. Harrington, principal, and entered the Institute June, 1871. Traveled extensively in this country and in Europe. Studied architecture in the office of Messrs. Robertson & Potter, in New York city; began work as an architect in 1879, in New York city, and made various designs for buildings in that city and vicinity. Married, September 8th, 1880, Frances Tileston Potter, daughter of Gen. Robert B. Potter, of Washington, D. C. Two children. P. O. address, Union Club, New York city.

CARLOS FRANCISCO CARBONELL, C. E., son of Isidro and Josefa (Lufriu) Carbonell, was born at Havana, Cuba, October 4th, 1854. Prepared by Chase and Scott, Philadelphia, Pa., and entered the Institute September, 1872, in Division C. Worked

a few months as substitute in park department, New York city ; a few months in the office of the Antioquia railroad, Colombia, S. A.; one year with Delaware bridge company ; three years with George S. Morrison, 52 Wall street, New York, together with Morrison, Field & Co., and the Platsmouth bridge, Nebraska ; in 1880, in the Havana gas works four months, and since 1881, cashier of banking house of Messrs. Todd, Hidalgo & Co., Havana, Cuba. 1885, engineer to Havana water works. P. O. address, Obrapia 25, Havana, Cuba.

WALTER EDWARD DAUCHY, C. E., (Crescent, N. Y.,) son of Edward Nathan and Marion (Pardee) Dauchy, was born in Troy, N. Y., March 5th, 1855. Prepared at public schools of Troy and Troy Academy, and entered the Institute September, 1871. In October, 1875 went to Aspinwall, I. P., in the employ of the Panama railroad company. Returned in 1878, to take position of assistant United States engineer on the improvement of the Arkansas river, at Pine Bluff ; July, 1879, went to Council Bluffs, on Missouri river improvements at that point ; October, 1879, division engineer Burlington & Missouri river railroad in Nebraska ; February, 1881, assistant United States engineer on Missouri river improvements at Atchison and Fort Leavenworth, Kansas ; June to September, 1881, assistant engineer Mexican National railroad ; October, 1881, assistant engineer Genesee Valley canal railroad company ; March, 1883, assistant engineer Lackawanna & Pittsburgh railroad ; 1885, assistant engineer Burlington & Missouri railroad. Member Rensselaer Society of Engineers. Married, April 8th, 1878, Florence Elder, of Troy, N. Y. Two children. P. O. address, McCook, Nebraska.

EDWARD WILLIAM ECKERT, C. E., (Pittsburgh, Pa.,) engineer Masillon bridge company. Member of the American Society of Civil Engineers. P. O. address, Massillon, O.

JOHN AKIN FERRISS, JR., C. E., son of John A. and Hannah (Clock) Ferriss, was born at Troy, N. Y., November 21st, 1853. Prepared at Troy Academy, and entered the Institute September, 1870. Prevented by a long illness in the junior year from graduating until 1875. Began work in second summer vacation as lineman, &c., on Erie extension narrow gauge railroad, be-

tween Attica and Buffalo, N. Y. Other vacations were passed surveying for West Troy water works. After graduation, entered the government office of the coast survey at Albany, where he was engaged on improvements of Hudson river, from State Dam, Troy, to Coeymans. At this work he remained about two years, when, in August, 1877, he went to New York as assistant engineer on construction of Third Avenue elevated railroad. In January, 1878, he sailed to the United States of Colombia, S. A., to construct a railroad from Honda to Bogota. Having indifferent success, and the company failing to keep their agreement, he returned in less than six months. August found him in New York, again engaged on the elevated road, until early in 1879, when he removed to Omaha as assistant to engineer Davis, in charge of improvements on Missouri river at that point. In same position, removed before the close of the year to Council Bluffs, remaining until the end of year 1880. Returning home for a short visit, he was attacked with pleurisy and prevented from resuming his work by a rapid decline in health, terminating in consumption and death at Round Lake, N. Y., September 23d, 1881. Member of the Rensselaer Society of Engineers.

TUCKER H. FISHER, C. E., son of John and Jane T. (Coles) Fisher, was born in Columbia, S. C., September 25th, 1852. Prepared under Capt. Hugh S. Thompson and the University of South Carolina, and entered the Institute September, 1872. Commenced the practice of his profession as resident engineer Low Moor iron mines, 1876–77; railroading, 1878–79; United States engineer, department Charleston, S. C., 1880–81; United States engineer, department Savannah, Ga., 1882–83; United States engineer, mouth of St. John's river, Fla., on improvement of harbor, since September, 1884. P. O. address, Fort George, Duval county, Fla.

WILLIAM LOGAN FOX, C. E., (Philadelphia, Pa.), son of Samuel M. and Mary R. (Fisher) Fox, was born in Foxburg, Clarion county, Pa., September 27th, 1851. Prepared at the University of Pennsylvania, and entered the Institute in September, 1871. He was the originator and president of the Foxburg, St. Petersburg & Clarion narrow gauge railroad; also

president of the Emlenton, Shippenville & Clarion narrow gauge railroad, in Venango and Clarion counties, Pa., both now being consolidated and parts of the Pittsburgh & Western railroad company. During his course of study at the Institute he was honored by an election to the post of grand marshal of the Institute. After graduation he visited Europe, where he spent a year, and on returning home assumed the management of the estate of his father, at Foxburg, Pa., where he afterwards resided. By his integrity and enterprise, combined with frankness and a subordination of self to the needs of others, he won a high place in the hearts and confidence of his neighbors. Seldom has a man so young, and with so limited an experience in such a responsible position, acquitted himself so nobly. On the morning of April 29th, 1880, he left home to attend the trial of a man who had shot a conductor in his employ. After the the train had started, he discovered that he had forgotten to bring with him the pistol with which the deed had been committed. He stopped the train, ran to his office, returned to the railway carriage exhausted, and died without a struggle. It was consistent with his whole life that, though he had been several days ill, and requiring care and rest, he deemed it his duty as president of the board, to attend this trial. At the time of his sudden death he was manager of the large tracts of land which for one hundred years have been in the possession of the Fox family, including the vast oil interests and pipe lines; was the owner of the Foxburg *Gazette*, chairman of the Republican county committee, and was selected as a presidential elector in the fall of 1880. He was always kind and generous, ever ready to lend a helping hand to alleviate pain and d.stress, and his death was a loss, not only to his own family, and the community in which he lived, but also to his friends in Troy, who had learned to honor and love him when he was a student at the Institute. Married, February 25th, 1879, Rebecca C. Hollingsworth, daughter of Dr. Samuel Hollingsworth, of Philadelphia. Died suddenly, of heart disease, April 29th, 1880.

Charles Tayler Judson, C. E., son of David and Ann E. (Cowee) Judson, was born at Lansingburgh, Rensselaer county, N. Y., September 8th, 1854. Prepared at Troy Academy, Troy, N. Y., and entered the Institute in September, 1871. Coal mer-

chant in Troy, N. Y., since April 1st, 1877. Married, December 19th, 1879, Helen M. Bucklin, daughter of Dr. Daniel D. Bucklin. Two children; one living. P. O. address, 51 River street, Troy, N. Y.

WILLIAM GIBSON KAY, C. E., (Chicago, Ill.), son of William V. and Jane (Gibson) Kay, was born in St. Louis, Mo., November 9th, 1854. Prepared at the Chicago Academy, H. H. Babcock, principal, and entered the Institute in September, 1871. May to October, 1879, assistant engineer Atchison, Topeka & Santa Fe railroad, headquarters at Topeka, Kansas. Has been engaged in constructing and superintending cotton seed oil mills; designed and built cotton seed oil mill at Chicago, also mill and refinery for the Robert B. Brown oil company, St. Louis, Mo., and cotton seed oil mill at Belton, Texas. 1886, American Oil company, New York. Married, in Waco, Texas, February 25th, 1886, Josephine S. Lambdin. Member of Civil Engineers' Club of the Northwest, Chicago, Ill. P. O. address, 18 Broadway, New York city.

EDWARD VAN ZANDT LANE, C. E., son of P. Van Zandt and Elizabeth A. (Luqueer) Lane, was born in New York city, N. Y., February 17th, 1855. Attended Holbrook's military school at Sing Sing, N. Y., and entered the Institute in September, 1871. In the fall of 1875 was member of a party making preliminary survey of proposed route for a new Croton acqueduct from Croton river to New York city; engaged in this work about three months; in January, 1876, employed by Blanchard, Brother & Lane, Newark, N. J., manufacturers of leather, remaining with them about a year; February, 1877, elected secretary and treasurer of the Mapes Formula and Peruvian Guano company of New York, which position he still retains. Married, June 7th, 1882, Grace M. Hustace, daughter of William Hustace, of New York city. One child. P. O. address, 158 Front street, New York city.

HENRY CHAMPLIN LAY, C. E., (Easton, Md.), son of Right Rev. Henry Champlin and Elizabeth W. (Atkinson) Lay, was born in Huntsville, Ala., July 13th, 1850. Prepared at Sorbonne, Paris, and University of Virginia. Was for two years on railroads in southwest Georgia and southeast Alabama, from 1869

to 1871, when he entered the Institute. With the Baltimore & Ohio railroad from June, 1875, to 1882. Since then in Colorado as mineral land surveyor. P. O. address, Telluride, Colorado.

WILLIAM BLAMIRE MAXWELL, C. E., (Nassau, Bahamas,) after leaving the Institute was assistant engineer on the Eastern division of the New York state canals, 1875–'76, and the following year, 1876–'77, on the Western division. He left Rochester for a visit to his home, but has not been heard from since that time by his friends and relatives. Supposed to be dead.

FRANK POND, C. E., son of W. F. and Frances H. (Griggs) Pond, was born November 20th, 1854. Prepared at Worcester High School, and entered the Institute in October, 1871. From February, 1876, in Leighton bridge and iron works, Rochester, N. Y.; five and a half years, since July, 1881, in Alden & Lassig bridge and iron works, Rochester, N. Y. Married, June, 1880, Sarah J. Caldwell. One child. P. O. address, Rochester, N. Y.

HARRY LESLIE RICHARDSON, C. E., (Great Barrington, Mass.) Mining engineer. P. O. address, Billings, Montana.

PALMER CHAMBERLAINE RICKETTS, C. E. *See Professors, page 162.*

FRANK LIONEL ROWLAND, C. E, was born August 23d, 1851, at Mystic River, Conn. Entered the Institute in September, 1872. Immediately after graduation was made assistant engineer on the East River bridge, being employed throughout the construction of the New York anchorage, and the approach to the Franklin Square bridge and the New York station building. He was inspector in the shops for the iron and steel work in the latter structure. Was then employed by the Louisville bridge and iron company as inspector of rails, iron, etc. Was also with the Atlanta, Ga., bridge company. Is now assistant engineer on the East River bridge. P. O. address, 22 Sands street, Brooklyn, N. Y.

HENRY DE WITT SMITH, C. E., (Marshall, Texas,) was born in Jersey City, N. J., November 11th, 1852. Chief engineer Marshall & Northwestern railroad. P. O. address, Marshall, Texas.

JOSEPH ROGERS UNDERWOOD, C. E., son of Eugene and Catharine Rebecca (Thompson) Underwood, was born in Nashville, Tenn., August 26th, 1851. His parents moving to Louisville, Ky., in 1861, and thence to St. Paul, Minn., in 1864, he prepared in the schools of those cities, and entered the Institute in 1871. He began the practice of his profession as assistant engineer on the Louisville & Nashville railroad, from which position he resigned on account of failing health. Then moved and located in Sherman, Texas, where he died, January 8th, 1878.

JOHN ALEXANDER LOW WADDELL, C. E., B. A. Sc., Ma. E., (Cobourg, Canada,) son of Robert Needham and Angeline E. (Jones) Waddell, was born in Port Hope, county of Durham, Ontario, Canada, January 15th, 1854, and entered the Institute November, 1871. In 1875, entered marine department at Ottawa, Canada, as draughtsman ; May, 1876, to July, 1877, rodman, &c., on Canadian Pacific railroad, near Prince Arthur's Landing ; afterwards contracting engineer on the same road for four months. Summer of 1878, mining engineer East Bank colliery, near Coalburgh, W. Va. In the fall of 1878, was appointed assistant in geodesy, etc., in the Institute, but was soon transferred to the department of rational and technical mechanics. Left the Institute in the fall of 1880, and in January, 1881, accepted the position of engineer with Raymond & Campbell, bridge builders, Council Bluffs, Ia. May, 1882, to 1885, professor of civil engineering in the University of Tokio, Japan. For some years has been consulting engineer for Raymond & Campbell, and has been one of the editorial staff of the *American Engineer ;* also of the *Canadian Magazine of Science.* February, 1882, received the adeundem degree of B. A. Sc., (Bachelor of Applied Science,) from the McGill University, Montreal. In June, 1882, passed the examination for the post graduate degree of Ma. E., (Master of Engineering,) at the same University. Member of American Society of Civil Engineers, Western Society of Engineers, Engineers' Club of Philadelphia, Rensselaer Society of Engineers, Graduates' Society of McGill University, and the Institution of Civil Engineers, London. Has written "Compensating Trusses," "Notes on Railroad Drainage," "Notes on Railroading," "Bridge Pins, their sizes and bearings," and "A System of Designing Highway Bridges," published by the Rensselaer Society

of Engineers, Troy, N. Y.; "Economy in Struts and Ties," and "General Specifications for Ordinary Iron Highway Bridges," published in *Canadian Magazine of Science;* "Details for Ordinary Iron Bridges," and "Dead Loads for Iron Highway Bridges," published in Journal of the association of Engineering Societies; "General Specifications for ordinary iron Railroad Bridges," published by Rensselaer Society of Engineers, Troy, N. Y.; "Economy in Highway Bridges," and "Lateral System for Iron Pratt Truss Highway Bridges," published by Engineers Club of Philadelphia; a treatise on "The Designing of ordinary iron Highway Bridges," published by J. Wiley & Sons, New York; "A System of Iron Railroad Bridges for Japan," published by the University of Tokio, and "An Analysis of Weights of Iron and Dead Loads for Iron Pratt and Whipple Truss Railroad Bridges," presented to the Institution of Civil Engineers, London. Married, July 13th, 1882, Ada Everett, daughter of Horace Everett, of Council Bluffs, Ia. Two children. P. O. address, Phoenixville, Pa.

JACOB TRIPLER WAINWRIGHT, C. E., was born in Philadelphia, Pa., September 8, 1854. Entered the Institute September, 1875. Draughtsman with William B. Reanz, mechanical engineer; draughtsman of M. A. Furbush & Son, woolen machinery; mechanical engineer with Jones & Benner, bridge builders and contractors; assistant engineer Keystone bridge company; assistant mechanical engineer in construction of Pittsburgh Bessemer steel company's works; mechanical engineer Risden iron works, San Francisco, Cal.; mechanical engineer Pacific iron works, San Francisco, Cal. At present mechanical engineer with Jones & Benner, bridge builders and contractors, Philadelphia, Pa. Inventor of the gaseo-steam engine. P. O. address, 1,916 North Thirteenth street, Philadelphia, Penn.

GEORGE BRAINARD WELLINGTON, C. E., A. M., LL. B., son of Charles M. and Lucy E. (King) Wellington, was born in Troy, N. Y., Nov. 14th, 1856. Prepared at the Troy Academy, with Professor T. N. Wilson, and entered the Institute in June, 1871. Never practiced engineering. Studied law, and was admitted to the bar, May, 1878. Since then attorney and counselor at law, Troy, N. Y. 1885, appointed United States assistant district attorney ol the Northern District of New York. Received

the degree of A. M. from Williams College, and LL. B. from the Albany Law School, (Union University). Married, February 26th, 1880, Harriet Townsend, daughter of Charles Townsend, of Buffalo, N. Y. Two children. P. O. address, Troy, N. Y.

CLASS OF 1876.

WILLIAM MILLER ALLAIRE, C. E., (New York City), was born August 24th, 1854, in Lewisborough, Westchester county, N. Y. He entered the College of the City of New York, where he remained until the close of sophomore year. In the fall of 1873 he entered the Institute, and graduated with his class in 1876. He then engaged in various engineering pursuits. He was for a time secretary of the American monitor register company, in London, England, treasurer of the Carlton glass company, New York city, assistant engineer in charge of New York steam heating and power company, civil engineer for the moving and erection of the Egyptian obelisk in Central Park, under Lieutenant Commander Gorringe, and engineer for the United States electric light company. He was a member of the American Society of Civil Engineers, and joined the Seventh regiment, N. G. N. Y. S., in 1883, and was noted as a marksman. He died of pneumonia, Sunday, December 14th, 1884, at his home in New York.

JAMES CASSEDY ANDERSON, C. E., son of Daniel S. and Amelia M. (Cassedy) Anderson, was born in Newton, Sussex county, N. J., August 3d, 1855. Prepared at Newton Collegiate Institute, and entered the Institute September, 1872. August, 1876, on Blairstown railroad until February, 1877; then on the New York, Susquehanna & Western railroad, as general freight and passenger agent, until March, 1881. Since then general freight and passenger agent New York, Ontario & Western railroad company. P. O. address, 24 State street, New York city.

ARTHUR GEILS BAKER, C. E., (Decorah, Ia.,) was born in Coronpore, East Indies, February 22, 1853. Since 1877, assistant engineer Chicago, St. Paul & Milwakee railroad, stationed at various points in Iowa, Minnesota and Dakotah Ter. P. O. address, Stillwater, Minn.

EDWARD ABBOTT BURDETT, C. E., son of George Colney and Abigail (Abbott) Burdett, was born in Troy, N. Y., March 29th, 1856. Prepared at the Troy Academy, and entered the Institute September, 1872. Engaged during the summer of 1877 on Hudson river improvement, having charge of the dredge, under the State engineer of New York. January 1st, 1878, employed by Burdett, Smith & Co., of Troy, stove manufacturers, at present managing their western branch, at Chicago, Ill. Married, October 3d, 1883, Anna Zug, daughter of Christopher Zug, of Pittsburgh, Pa. One son, Reginald Burdett, born January, 1885. P. O. address, 72 Lake street, Chicago, Ill.

EDWARD CARLOS CARTER, C. E., (Jacksonville, Ill.), son of George and Louise J. (Smith) Carter, was born in Waverly, Morgan county, Ill., January 11th, 1854. Studied with H. C. Hammond, private tutor. Removed to Jacksonville, Ill., in 1864, and attended public schools, High School, preparatory department Illlnois college, and Jacksonville Business College. Entered the Institute in September, 1872. In the summer of 1869 started as back flagman on survey of Jacksonville, Southeastern and Northwestern railroad, and occupied positions as axman, rear and front chain, and rodman; summer of 1871 as chainman, rodman and leveler on Illinois Farmers' railroad; fall and winter of 1871 and spring of 1872, second assistant engineer on location of Cairo & St. Louis narrow gauge railroad; summer of 1873, first assistant on location of the Chicago & South Atlantic railroad in Indiana; September, 1876, entered machine shop of Springfield iron company, Springfield, Ill; afterwards draughtsman and mechanical engineer same company for one year; January, 1878, Chicago & Alton railroad as second assistant engineer on location of Kansas City division, and later in charge of construction of Blue Spring division; November, 1878, entered employ of United States Mississippi river improvement engineer corps as first assistant to S. W. Fox, chief of observation and experimental party from mouth of White river to Arkansas City; April 1st, 1879, assistant engineer on Indianapolis, Decatur & Springfield railroad, in charge of construction of division in Indiana; winter of 1879–80, first assistant on preliminary survey of Kansas City extension of same road; June, 1880, assistant engineer Wabash, St. Louis & Pacific railroad; June, 1882,

resident engineer Illinois division same road; July, 1883, resident engineer middle and northern division in Illinois of same road, the position being that of engineer in charge of maintenance and repairs of bridges, buildings, water stations, etc., on 1,355 miles of road; 1886, Detroit bridge and iron works, Detroit, Mich. Member of Civil Engineers Club of the Northwest. Married, December 16th, 1880, Fannie G. Fairbank, daughter of D. W. Fairbank, of Jacksonville, Ill. P. O. address, Detroit, Mich.

JOSIAH REES TUDOR DAVIS, C. E., A. M., (Philadelphia, Pa.,) son of Thomas Rees and Catharine (Fosselman) Davis, was born in Altoona, Blair county, Pa., November 17th, 1854. Prepared in the public schools of Philadelphia, including the Central High School, and entered the Institute November, 1872. May to November, 1872, Pennsylvania railroad's engineer corps, Hollidaysburg, Pa.; August, 1876, to June, 1877, with same road, at Altoona, Pa.; June to August, 1877, at Gallitzin, Pa.; August, 1877, to March, 1878, at Pittsburgh, Pa.; March, 1878, to July, 1881, at Greensburg, Pa.; since then with same road at Williamsport, Pa. Received degree of A. B. and A. M. from Central High School, Philadelphia, Pa. Married, October 17th, 1878, Sara P. McAllister, daughter of Archibald McAllister. One child. P. O. address, Williamsport, Lycoming county, Pa.

STEPHENSON WATERS FOX, C. E., (Louisville, Ky.), son of William H. and Virginia E. (Boss) Fox, was born in Natchez, Adams county, Miss., August 3d, 1856. Prepared at High School at Louisville, Ky. During 1870 and 1871, railroad engineering, surveys and construction in subordinate positions in Louisville, Ky. Entered the Institute in September, 1872; summer of 1873, engaged in railroad construction in Kentucky; September, 1876, to March, 1877, architectural iron works, Louisville, Ky.; March, 1877, to August, 1877, general practice in Deadwood and vicinity, D. T., September, 1873, to date, United States assistant engineer, as follows, viz: September, 1878, to December, 1878, in office at St. Louis, Mo.; December, 1878, to April, 1879, in charge of party on lower Mississippi river; April, 1879, to March, 1883, in charge of improvement works on Missouri river, at Glasgow and Cedar City; March, 1883, to March, 1884, in charge of improvement works, Missouri river, at St.

Charles; March, 1884, to date, in charge of improvement works, Missouri river, St. Joseph division. Member American Society of Civil Engineers. Married, September 13th, 1883, Mildred Collins, daughter of Dr. M. B. Collins. One child. P. O. address, St. Joseph, Mo.

ISAAC WILLIAM FRANK, C. E., son of William and Paulina (Wormser) Frank, was born in Pittsburgh, Allegheny county, Pa., December 2d, 1855. Prepared at Western University of Pennsylvania and Newell Institute. Spent much time in machine shops, and had built two steam engines before his fourteenth year. Entered the Institute September, 1872. Employed with Keystone bridge company, of Pittsburgh, as draughtsman, from July, 1876, to April, 1877. Spent the summer of 1877 with Lewis, Oliver & Phillips, superintending the placing of various machinery and foundations. November, 1877, returned to Keystone bridge company, and remained until March, 1878; then went with New York Elevated railroad company as inspector of rails until July, 1878. December, 1878, was employed under Major Benyard, above Vicksburg, in the determination of currents, &c., of the Mississippi river, until June, 1879. Then went to Leadville, Col., and engaged in mining surveys, as deputy United States mineral surveyor, until November, 1880. February, 1881, engaged with Richmond & Allegheny railroad, as inspector of bridge material, where he remained until November, 1881, when he engaged as partner in present business, "The Lewis Foundry and Machinery company, limited." Member of Engineers' Society of Western Pennsylvania. Married, November 15th, 1883, Tinnie Klee, daughter of Jacob Klee. P. O. address, Secretary Lewis Foundry and Machine Co., Limited, Pittsburgh, Pa.

HAROLD AUGUSTUS FREEMAN, C. E., was born September 20th, 1857, in Philadelphia, Pa. Since his graduation, has been engaged in business with James A. Freeman & Co., auctioneers. P. O. address, 422 Walnut street, Philadelphia, Pa.

GOTTLIEB GEUDER, C. E., son of Adolph and Charlotte (Ott) Geuder, was born at Dover, Cuyahoga county, O., November 24th, 1853. Prepared at the public schools of Cleveland, Ohio. Had some experience in city engineer's office during vacation.

Entered the Institute in September, 1872. Spent one vacation on preliminary survey of the Cuyahoga Valley railroad. After graduation employed as assistant engineer on Cleveland viaduct; remained there about two years; summer of 1878, employed as assistant superintendent of bridges on L. S. & M. S. railroad, remaining about two years; from fall of 1880 to fall of 1882, assistant engineer on government work, improving the Missouri river at Cedar City, Mo.; then for one year employed by the Mississippi river commission, first in designing machinery, and then as assistant in charge of a reach of Plum Point, Tenn.; fall of 1882, employed by the Brown hoisting and conveying machine company of Cleveland, Ohio, as engineer. Member of Civil Engineers' Club of Cleveland, Ohio. Married, November 21st, 1882, Else Rose Krause, daughter of C. B. Krause. One child. P. O. address, 522 Kennard street, Cleveland, Ohio.

ARTURO GUERRA, C. E., was born in San Juan, Porto Rico, November 29th, 1856. Civil engineer, Madrid, Spain.

WILLIAM HENDERSON, C. E., son of George and Jane (Madison) Henderson, was born in Troy, N. Y., September 28th, 1852. Prepared at Troy High School, and entered the Institute fall of 1872. After graduation was assistant engineer on the Troy & Boston railroad for one year. Then went South, January, 1879, as United States assistant engineer on the White river, Arkansas, remaining until July, 1879. 1880–81, assistant engineer, improvement of Missouri river, St. Joseph, Mo., and re-appointed to same position in 1883–84. Since then in Dakotah, and at present assistant librarian of Young Men's Association, Troy. Married, October 1st, 1882, Julia A. Padley, daughter of Richard G. Padley, of Troy, N. Y. Two children. P. O. address, Troy, N. Y.

JOSEPH BERNARD HOEING, C. E., was born in Lexington, Fayette county, Ky., March 27th, 1855. Entered the Institute in October, 1872. From July 1, 1876, after graduating, practiced his profession until 1879. Topographical work on Kentucky geological survey and geodetic work under United States coast survey in Kentucky, for Kentucky geological survey; 1879 to 1881, mining engineering in Colorado; 1881 to present time in charge of topography and map work in state of Kentucky, Ken-

tucky geological survey. Was married April 17, 1879. Three children. P. O. address, Kentucky Geological Survey, Lexington, Ky.

WILLIAM WALKER HUNTINGTON, C. E., (Brooklyn, N. Y.), son of William S. and Mary (Walker) Huntington, was born in Middlefield, Otsego county, N. Y., September 12th, 1853. Attended the public schools of Brooklyn and prepared at the Brooklyn Polytechnic Institute. Spent a year in Iowa, during 1870 and 1871, in a railroad office, and entered the Institute in the fall of 1872. Spent the latter part of the summer of 1876 on a branch of the C. & N. W. railroad, in western Iowa; the greater part of 1878 in northwestern Iowa and eastern Dakota, on the C. M. & St. P. railroad; January, 1879, in Leadville, in employ of Leadville Consolidated Mining Co., as mining engineer. 1886, manager of the Eagle Bird mines, Red Cliff, Col. P. O. address, Red Cliff, Colorado.

RUSSELL LAY HUNTLEY, C. E., (Troy, N. Y.,) son of Henry A. and Maria M. Huntley, was born March 30th, 1855, at Westfield, N. Y. Prepared at the Troy High School, and entered the Institute September, 1872. From October, 1876, for about one year, was transitman on the Troy & Boston railroad. From November, 1877, about two years, was bookkeeper for the firm of D. E. Paris & Co., Troy, N. Y. From January, 1880, about six months, assistant engineer on the Mississippi river, stationed at Vicksburg, Miss., and then spent some time in the works of Messrs. Gurley, in Troy. From July, 1880, draughtsman New York & Brooklyn bridge, New York. From February, 1881, leveler on the New York Central & Hudson River railroad, about two years, and then assistant engineer on the same road. At present in Nebraska on the B. & M. railroad. P. O. address, Troy, N. Y.

JOHN PATRICK KELLY, C. E., son of Richard and Bridget (Organ) Kelly, was born in Troy, N. Y., August 10th, 1854. Prepared in the public schools of Troy, N. Y., and entered the Institute September, 1872. In March, 1877, was appointed assistant city engineer of Troy, N. Y., resigning in 1879. July, 1879, appointed United States assistant engineer in charge of observation party at Clarendon, on White river, Ark.; party was called

in, July, 1879. From July to November, 1879, and from May to November, 1880, surveyed mining claims in Colorado, receiving, in March, 1880, an appointment as United States department mining surveyor. From November, 1880, to May, 1881, rodman on government work, improvement of rivers, at St. Joseph, Mo.; May to August, 1881, United States assistant engineer at Leavenworth, Kan., on improvement of rivers, August, 1881, to May, 1882; transitman on location for Burlington & Marquette railroad in Kansas, Nebraska and Colorado, July to October, 1882; land surveying in Iowa, and in land business in Hyde county, Dak.; October, 1882, to July, 1883, division engineer in charge of construction of first eleven miles of railroad from Beatrice, Neb., to Tecumseh, Neb., for B. & M. railroad; July, 1883, was made locating engineer for the same road, and was sent out with a party, locating lines in Kansas and Southeastern Nebraska. At present engaged on the canals of New York State. P. O. address, Troy, N. Y.

JAMES COOK KINGSLEY, C. E., M. E., son of William C. and Catherine (Cook) Kingsley, was born at Salzburg, Indiana county, Pa., March 31st, 1856. Prepared at the Brooklyn Polytechnic Institute, and entered the Institute in September, 1873. Has been practicing as civil and mining engineer in Colorado, (Leadville and Silverton), since the spring of 1882. Graduated at the Royal Mining Academy, Freiburg, Saxony, Germany, in 1880, receiving the degree of mining engineer. Member of American Institute of Mining Engineers. P. O. address, Silverton, Col.

GEORGE OWEN KNAPP, C. E., (Hartford, Conn.), son of Rev. J. O. and Sarah E. (Beach) Knapp, was born in Hatfield, Mass., January 23d, 1855. Preparation was made for the Institute at Hartford, Conn., High School, also in connection with government survey of Connecticut river, under General T. G. Ellis. Entered the Institute in September, 1872. Began work September, 1876, as assistant United States engineer on improvement of Connecticut river, and building breakwater at Saybrook, Conn.; fall and winter of 1877–78, assistant superintendent New Britain gas works, Conn, and also inspector of construction of the building of the Municipal gas works, New York city; June, 1879, engineer in charge of laying street mains and constructing

works of the Fulton Municipal gas company, Brooklyn, N. Y.; October, 1880, began the remodeling of the Knickerbocker gas works, New York city; May, 1881, appointed chief engineer of the Fulton Municipal gas company, Brooklyn, N. Y., where he still remains. Married, June 16th, 1881, Isabella Murray, daughter of William S. Murray, of Brooklyn, N. Y. One child. P. O. address, Nevine and Degraw streets, Brooklyn, N. Y.

EDWARD JOHN LANDOR, C. E., son of Henry and Mary (Shaw) Landor, was born in Norwich, Norfolk, England, May 19th, 1855. Spent eight months in carpenter shop, London, Ontario, followed by seventeen months in Grand Trunk Locomotive Works at Point St. Charles, Montreal, P. Q. Entered the Institute, September, 1873. Entered the service of the Wrought Iron bridge company, Canton, O., May 27th, 1877, having passed two months in the fall of the previous year on the extension of the Kingston & Pembroke railroad, followed by three months with Molson's bank, London branch, beginning with February, 1877. Married, April 14th, 1884, Mary Higgins. P. O. address, 62 South Plum street, Canton, O.

SAMUEL BRACKET LOW, C. E., son of Hovey Perkins and Francis Jane (Koogle) Low, was born at Memphis, Tenn., November 16th, 1856. Prepared at M. W. Hasbrouck's Institute, Jersey City, N. J., and entered the Institute in September, 1872. Clerk in general store in Star City, Ind., from September, 1877, to April, 1878; spent four months on the plains as cow boy; returned and had charge of store for eleven months; prior to going to Indiana had been to sea, as tutor to captain's children, and also to Panama, employed by Panama railroad company; in 1880 built a store at Pulaski, Ind., remaining in charge eight months; then sold out and went to Wyandotte, Kan.; interested in pork packing, Kansas City, two years; did drafting and some contract work the next year; came to New York in 1883, and is now with H. P. Low & Co., commission merchants. Married, August 10th, 1879, Martha J. Welch, daughter of Edward W. Welch. One child. P. O. address, 342 Produce Exchange, New York city.

SOUICHIRO MATSMOTO, C. E., was born in Ogaki, Japan, December 13th, 1851. At present mining engineer, Kai Taku Shi, Saporo, Ishakara, Japan.

JOHN McLEAN, C. E., M. D., son of N. C. and Caroline (Burnet) McLean, was born in Cincinnati, Hamilton county, Ohio, June 23d, 1854. Prepared at Shattuck School, Fairbault, Minn. At the time of entering the Institute, in the fall of 1872, was a resident of Cincinnati, but had lived previously at Glendale, Ohio, and at Frontenac, Minn. Graduated from Jefferson Medical College, Philadelphia, March, 1881. Practiced in that city until September, 1883, when he moved to his present residence, Moorhead, Minn.; county physician from March, 1884, to date, Clay county, Minn. Received the degree of M. D. from Jefferson Medical College, Philadelphia, Pa. Married, August 28th, 1876, Nellie A. Sheldon, daughter of T. B. Sheldon, of Red Wing, Minn. One child. Wife died June 25th, 1877. Married, April, 1881, Jennie E. Riley, daughter of Bernard Riley, of Philadelphia, Pa. P. O. address, Moorhead, Minn.

JOHN WALTER NIER, C. E., (Detroit, Mich.,) son of William and Lucy A. (Harding) Nier, was born in Youngstown, Mahoning county, O., October 2d, 1851. Prepared at Mount Union College, Mount Union, O., and entered the Institute September, 1872. After graduation, engaged in miscellaneous practice until November, 1877. In Lake Superior iron works, Houghton, Mich., November, 1877, to August, 1878. Engineering work, Black Hills, Dakota Ter., August, 1878, to October, 1878. Assistant engineer United States improvement, Missouri river, Nebraska City, Neb., October, 1878, to June, 1879; assistant engineer in charge of boring operations, Mississippi river, for corps of United States engineers, January, 1879, to May, 1879; assistant engineer in charge of Missouri river improvement, Kansas City, Mo., May, 1879, to August, 1882; United States division engineer in charge of Kansas City division Missouri river improvement, May 1882, to May, 1883; miscellaneous engineering, May to October, 1883; since that date, superintendent of constructive engineering department, Kansas City, Mo. Member of Rensselaer Society of Engineers and of Engineering Club, of Kansas City, Mo. Married, June 16th, 1879, Isabella McDonald, daughter of Malcom McDonald, of Hancock, Mich. Two children. P. O. address, Kansas City, Mo.

JOHN BUCKINGHAM PARKINSON, C. E., (Buffalo, N. Y.,) son of Benjamin D. and Susan (Sherwood) Parkinson, was born in Boston, Mass., May 3d, 1856. Attended Central High School at Buffalo, N. Y., previous to entering the Institute in September, 1872. In April, 1878, went upon the location of the Kendall & Eldred railroad in the Bradford, Pa., oil regions, but was compelled after one month to leave, on account of sickness. In 1878, held a position on the United States river improvement at Wabasha, Minn. Was assistant engineer in the office of Major Charles J. Allen, April, 1879, to February, 1880. Accepted a position on St. Paul, Minneapolis & Omaha railroad, in charge of local improvements in St. Paul, from April to August, 1880, then returned to office of Major Allen, where he still remains. Married, June 18th, 1878, Helen A. Campbell, daughter of John Campbell. P. O. address, Box H, St. Paul, Minn.

CHARLES SCHERMERHORN PEASE, C. E., (Troy, N. Y.,) son of Robert M. and Elizabeth (Schermerhorn) Pease, was born in South Deerfield, Franklin county, Mass., November 11th, 1854. Prepared at Tarrytown Military Institute, and entered the Institute September, 1871. In 1877 was United States inspector of harbor improvements, Eagle Harbor, Mich. United States inspector Ahuapee harbor and Sturgeon Bay, Wis., 1878 to May, 1879; United States assistant engineer, Omaha, Neb., May to November, 1879; assistant engineer Atchison, Topeka & Santa Fe railroad, Topeka, Kan., November, 1879, to July, 1880; United States engineer in charge of Missouri river improvements, Omaha, Neb., 1880–84; mechanical engineer, Omaha, 1884. Designed and built North Pin Sturgeon Bay Canal entrances, Wis.; and harbor front, city of Omaha, Neb. 1885, contractor and consulting engineer, New York city. Member of Rensselaer Society of Engineers, and Western Society of Engineers. Published pamphlet, "A Protection to Railway Embankments"; also, Transactions of the Rensselaer Society of Engineers, January, 1880. P. O. address, 17 Courtland street, New York city.

DE FOREST PRUYNE, C. E., (Belleville, N. Y.,) son of Matthew and Marcia (Colegrove) Pruyne, was born at Ellisburgh, Jefferson county, N. Y., October 1st, 1854. Prepared at Union Academy, Belleville, N. Y., and Hungerford Collegiate Institute,

Adams, N. Y., and entered the Institute September, 1873, Division C. During the season of 1876 was employed by John D. Van Buren, New York state engineer, as engineer and inspector of dredging operations on the Hudson river between Troy and New Baltimore. In 1877, employed by Lieut. Willard, U. S. A., as superintendent of construction of dikes, near New Baltimore, N. Y. 1878–80, engaged as assistant United States engineer, in charge of survey of Mississippi river at Lake Providence, La., and in charge of improvements of Missouri river, at St. Joseph, Mo. 1881–82, in service of United States rolling stock company, at Chicago. Married, January 15th, 1878, Katie E. Gary, daughter of Holden H. Gary, of Troy, N. Y. Deceased.

HENRY CLAY SHAW, C. E., son of Thomas Wilson and Catharine (Stoner) Shaw, was born at Pittsburgh, Allegheny county, Pa., February 26th, 1855. Prepared at the grammar and Central High School of Pittsburgh, and entered the Institute September, 1872. In 1876 began work as assistant engineer on the Pittsburgh & Southern railroad. Division engineer on the Pittsburgh, Newcastle & Lake Erie railroad in 1878. Draughtsman for National tube works in 1879, and left there to take same position at the works of the Albany & Rensselaer iron and steel works, now called the Troy iron and steel company, where he is at present. Member of American Institute of Mining Engineers. P. O. address, Troy, N. Y.

CHARLES SOOYSMITH, C. E., (Maywood, Ill.,) son of William and Elizabeth (Haven) Sooysmith, was born in Buffalo, N. Y., July 20th, 1856. Prepared by his father, and entered the Institute in the fall of 1872. During his entire youth, previous to entering the Institute, was with his father on various large works in the West. After graduating, spent two years in Europe, one as regular student at the Polytechnicum, Dresden, Saxony. From June, 1878, to spring of 1879, was first assistant engineer of bridge over the Missouri river at Glasgow, Mo. From March, 1879, to March, 1880, assistant superintendent of track, bridges and buildings, of Atchison, Topeka & Santa Fe railroad, headquarters, Topeka, Kan. Since then of the firm of William Sooysmith & Son, civil engineers and contractors, Chicago, during which he has been in charge, alternating with his father, of Hudson river tunnel, New York; substructure for

bridge of Charleston & Savannah railroad, over Savannah river, Ga.; over the Yazoo, near Vicksburg, Miss.; Plattsmouth bridge over the Missouri river, and various other works. Member of Rensselaer Society of Engineers, and Western Society of Engineers. Married, March 30th, 1880, Virginia Walker Stringfellow, daughter of Gen. B. F. Stringfellow. Two children. P. O. address, Montauk Block, Chicago, Ill.

EDWARD RAY THOMPSON, C. E., son of John Leland and Mary P. Thompson, was born in Troy, N. Y., March 19th, 1854. Prepared at Troy Academy, and entered the Institute June, 1871. Was one year in Bement's machine shop, Philadelphia, Pa.; one year in Burden's machine shop, Troy, N. Y.; one year in Bessemer steel works, Troy, N. Y., and six months in Vulcan iron and steel works, St. Louis. Visited Europe three times, and studied one year in Paris. P. O. address, Troy, N. Y.

MORRIS SCOTT VERNER, C. E., son of James and Anna Maria (Murray) Verner, was born in Pittsburgh, Allegheny county, Pa., November 8th, 1855. Prepared at Pittsburgh Central High School, and entered the Institute September, 1872. Summer of 1876, entered the service of Pennsylvania railroad, maintenance of way department; left the same in the spring of 1882. Supervisor of P. V. H. division, Pennsylvania railroad. P. O. address, 939 Pennsylvania avenue, Pittsburgh, Pa.

THOMAS HORACE WALBRIDGE, C. E., son of Horace S. and Isabella D. (Watkins) Walbridge, was barn in Toledo, Lucas county, O., January 3d, 1855. Prepared in the Toledo public schools, and entered the Institute 1872. Secretary and manager of Toledo car wheel and foundry company, from March, 1882, to January, 1884. Cashier Northwestern Savings Bank, of Toledo, 1876. Clerk and consulting engineer Woodlawn cemetery, Toledo; junior member of firm of H. S. Walbridge & Co., dealers in real estate, bonds and mortgages, &c. Planned, superintended and constructed several business blocks and offices in Toledo. Published in Toledo, March, 1884, a pamphlet descriptive of Woodlawn cemetery, with the dedicatory exercises, Married, February 27th, 1878, Mary Young, daughter of James Young, of Toledo, O. Three children, two living. P. O. address, 160 Summit street, Toledo, O.

AARON JAMES ZABRISKIE, C. E., son of James P. and Eliza (Van Voorhis) Zabriskie, was born in Jersey City, N. J., December 17th, 1854. Prepared at Hasbrouck Institute, Jersey City, N. J., and entered the Institute in December, 1872. Engaged with his father in building business in Jersey City, N. J., until March, 1879, when he received position as rodman on New York Elevated railroad, upon foundation, construction through Ninth Avenue, where he was employed until completion of the work, January 1st, 1880. Transitman on Albany & Jersey City railroad June to September, 1880, running preliminary line between Rondout and Catskill; September, 1880, transitman on construction of Bergen railroad, running from Rutherford and Ridgewood, N. J., about ten miles, a branch of the New York, Lake Erie & Western railroad. During autumn of the following year was appointed assistant engineer on the same work, where he remained until completion, January, 1882, when he took charge of the construction of docks, buildings and stock yards at Weehawken, N. J., for the same company, remaining until their completion, January 1, 1883. January 16, 1883, assistant engineer in charge of construction in Cayuga county, N. Y., on New York, West Shore & Buffalo railroad; January 1st, 1884, appointed assistant engineer on same road; one month after, the road went into a receiver's hands, and the office was abolished. May 1st, 1884, superintendent of construction on five miles South Pennsylvania railroad, through Somerset county, for Shields & Dornin, contractors. Remained there until February 10th, 1885, when he accepted a position as first assistant engineer on the improved system of sewerage in Newark, N. J. Married, August 21, 1883, Mary E. De Clark, daughter of Cornelius De Clark. P. O. address, Room 3, Heath Building, Newark, N. J.

CLASS OF 1877.

JAMES FRANKLIN ALDRICH, C. E., son of William and Anna Mary (Howard) Aldrich, was born at Two Rivers, Manitowoc county, Wis., April 6th, 1853. Prepared at Shattuck Hall, Faribault, Minn., and entered the Institute September, 1872. Engaged in manufacturing, July, 1877, to May, 1882. Since then

grain commission merchant in Chicago. At the present time is candidate for County Commissioner in the fifth district of Cook county, and according to the press, will be elected by a large majority. Member of Western Society of Engineers. Married, November 13th, 1878, Lulu M. Sherman, daughter of Gen. F. T. Sherman, of Chicago. Three children. P. O. address, 240 La Salle street, Chicago, Ill.

CHARLES GUSTAV AUERBACH, C. E., (Brooklyn, N. Y.,) son of Charles Bernhard and Julia (Ferber) Auerbach, was born in Newark, N. J., February 2d, 1854. Prepared at Cornell University, and entered the Institute September, 1874. Engaged in city surveying July, 1877, to November, 1877; with Phœnixville bridge company, as draughtsman, November, 1877, to May, 1878; Delaware bridge company, as draughtsman, May, 1878, to August, 1878; in United States government employ, under General John Newton, August, 1878, as draughtsman and assistant engineer, Mississippi river commission; assistant engineer to president, Gen. Comstock, October, 1883, to date. Member of "Technisher Verein," New York. Married, May 16th, 1880, Anna M. Strasser, daughter of Joseph Strasser. Two children. P. O. address, Box 93, Station A, New York city.

ARTHUR JARED BEST, C. E., son of James and Mary A. (Chubb) Best, was born in New York city, August 22d, 1854. Prepared at Williston Seminary, East Hampton, Mass., and entered the Institute September, 1873. Entered on professional work at Atchison, Kan., September, 1878; two weeks later went to Leavenworth, Kan.; at the end of three months went to Clarendon, Ark., and was there was one month; then went to Alexandria, La., where at the end of six months the work was completed. During December, 1881, and January, 1882, was employed by the Colorado Springs land company, making contour surveys, followed by a few weeks of city work. Was proprietor of a straw paper mill at Chatham. N. Y., for sixteen months commencing March, 1880, but was compelled to retire on account of ill health. In May, 1881, went into the plumbing business, but sold out in November, 1883. In June, 1884, went to Denver, Col., and embarked in the wholesale and retail coal business. Married, June, 1881, Helen May Sterne, daughter of

Samuel Sterne. Two children. P. O. address, 137 Nineteenth street, Denver, Col.

CODDINGTON BILLINGS, JR., C. E., (Chicago, Ill.,) son of Coddington and Mary S. (Williams) Billings, was born at Stonington, Conn., in 1856. Entered the Institute September, 1873. He never followed the profession of engineering, but engaged in the business of banking, at Independence, Kansas, immediately after graduating. He died in France, August, 1881. Member of the Rensselaer society of engineers.

LLEWELLYN HARVIE BLANTON, C. E., son of Alexander M. and Emma (Swigert) Blanton, was born in Frankfort, Franklin county, Ky., October 11th, 1853. Preparation for the Institute was made with Professors B. B. Sayer, William Thurmond and at the Kentucky Eclectic Institute. Entered the Institute September, 1872. Employed on P. R. R., in department of highways and bridges, in May, 1876, and was stationed at Susquehanna, Pa., through the summer and transferred to Philadelphia office in the fall. Did some engineering work in Kentucky and Texas, previous to returning to the east in February, 1877, after graduating. Entered present business, merchant miller, in manufacturing flour, August, 1879, of firm of Blanton. Watson & Co. P. O. address, Indianapolis, Ind.

OLIVER AUGUSTUS OLSEN BOSTROM, C. E., (Buffalo, N. Y.,) son of Oliver and Anna L. (Joranson) Bostrom, was born in Dalkarlsa, county of Bygdea, state of Westerbotten, Sweden, December 9th, 1846. Prepared for the Institute at Buffalo, N. Y., under School Superintendents J. Fullerton, D. Crooker and Miss M. Costello. Entered the Institute September 17, 1873. Having received a limited theoretical education, but with good opportunities to obtain a practical knowledge of ship building and iron and mechanical works, he left his home in Sweden at an early age, and went to sea in the Swedish merchant marine. Followed this occupation for a time, holding the position of second mate for the last two years. Desiring to secure a more complete education, he came to the United States in 1869, to procure additional means, for the accomplishment of that object, his intention being to return and go through the course of studies at some Swedish Institution. The first winter after his

arrival he spent at Buffalo, N. Y., in a grammar school, with the object of learning the language, and afterwards, for two years, had charge of a rigging loft. Afterwards was employed in an architects office. While at the Institute, he surveyed, during one of the vacations, the camp-meeting grounds at Round Lake, N. Y. After graduation, he went to Washington, D. C., to assist in some experiments and also made calculations, drawings and estimates for refrigerating machines, which were approved by a board of experts. In 1880 he went to the United States Navy Yard, League Island, Pa., as assistant in department of steam engineering, where he remains, having charge of the draughting room of the department. Married, September 10th, 1878, Christina Hallstrom, daughter of Pehr Hallstrom, of Alfta, Sweden. Two children. P. O. address, U. S. Navy Yard, League Island, Pa.

JOSEPH BUSHNELL, Jr., C. E., (Parker City, Pa.,) son of Joseph and K. E. (McFadden) Bushnell, was born in Cincinnati, O., December 12th, 1857. Prepared with R. M. McClellan, West Chester, Pa., residing in Titusville, Pa., and entered the Institute September, 1873. Was a student at Bessemer steel works, Troy, N. Y., August, 1877, to July, 1878. In October, 1878, with the Acme oil company, Titusville, Pa.; June, 1879, Atlantic refining company, Philadelphia, Pa. 1885, oil refining company, Titusville, Pa. Married October 27th, 1881, Alice I. Stone, daughter of Charles Stone, of Troy, N. Y. Two children. P. O. address, Titusville, Pa.

WILLIAM HENRY BYRAM, C. E., (Detroit, Mich.,) son of Chas. and Harriet (Palmer) Byram, was born in Detroit, Wayne county, Mich., July 31st, 1851. After graduating from one of the Union Schools in Detroit, went one year to the Detroit high school, then went to learn the trade of carpenter and joiner, during which time he took several courses of drawing lessons under a French engineer. Entered the Institute September, 1872; after two years at the Institute was obliged to remain at home for one year, returning in 1875; in November, 1879, entered upon work as rodman under Assistant L. E. Cooley, at Nebraska City; January 1st, 1880, went on an observation party on the Mississippi river at Plum Point; April, 1880, assistant engineer

to Kansas City; January, 1881, was sent by Major Suter to Arkansas river to make some experiments in the use of dynamite for destroying snags; March, 1881, went to Pine Bluff, Ark., as assistant in charge of the improvements of the Arkansas river, remaining in charge two years, when he resigned, to locate in business at home; in September, 1883, in the foundry business and manufacture of Collian patent cupolas and blast furnaces. At present located in Kansas City as civil engineer and architect. Member of Rensselaer Society of Engineers. Married June 1st, 1880, Florence C. Nier, daughter of William Nier. Two children. P. O. address, 1,402 Jefferson street, Kansas City, Mo.

DANIEL WHIPPLE CHURCH, C. E., (Wegatchie, N. Y.,) son of Daniel and Harriet (Law) Church, was born in Morristown, St. Lawrence county, N. Y., March 15th, 1853. Attended Gouverneur Wesleyan Seminary. Resided at home, except during the summer of 1871, which he spent in the survey of Red Wing & Mankato railroad in Minnesota, filling the position of rodman. Entered the Institute Feburary, 1874. Began work in the engineer's office of Fitchburg railroad at Fitchburg, Mass., July, 1877. August, 1878, accepted the position of United States assistant engineer, under Maj. Charles R. Suter, corps of engineers; United States army, and was assigned charge of the work of improving the Missouri river in the vicinity of Leavenworth, Kan. During the winter of 1878 and 1879 he organized a party to make observations on the Mississippi river at Lake Providence, La., and remained in charge until April, 1879, when he was ordered to Atchison, Kan., to resume work on the Missouri river, having charge of the improvement works at Leavenworth, Atchison and St. Joseph. Remained in charge until September, 1880, when his office was removed to St. Joseph, and the Atchison and Leavenworth charges were transferred. In July, 1882, the St. Joseph division of the Missouri river improvement was erected, and he was made chief of division. Resigned this position March, 1884, to accept the position of assistant engineer of the wrought iron bridge company of Canton, O.; 1885 engineer, Fitchburg, Mass. Member of Rensselaer Society of Engineers. P. O. address, Fitchburg, Mass.

CHESTER BIRGE DAVIS, C. E., son of Charles H. and Dianna L. Davis, was born at Troy, Rensselaer county, N. Y., October 21st, 1853; entered the Institute September, 1873. Began active work during vacation of 1876, before graduating, as assistant to United States and New York state engineer on Hudson river improvements; November 1st, 1877, accepted position of engineer of mines at Coalburg, W. Va. July, 1878, was appointed United States assistant civil engineer, in charge of Missouri river improvements at Atchison, Kan.; Omaha, Neb.; and Council Bluffs, Iowa. Resigned August, 1880, and engaged in manufacturing at Omaha, Neb., which he gave up, in March, 1881, to accept the position of chief engineer of construction of Omaha water works. After completing this work, in the winter of 1882, established himself as a consulting hydraulic engineer for hydraulic and sanitary engineering work in Chicago, Ill., and in April, 1883, formed a partnership with General William Sooysmith & Son, civil engineers in these branches of civil engineering. Was chief engineer of water works at Madison, Wis., and at Dalles, Texas; consulting engineer on water works at Des Moines, Ia.; Fairfield, Iowa; Mason City, Iowa; Aurora, Ill.; Eau Claire, Wis., and Sheboygan, Wis.; consulting engineer on sewerage at Marshalltown, Iowa; Elgin, Ill., and Cedar Rapids, Iowa. Member American Institute Mining Engineers, 1878; American Society of Civil Engineers, 1882; Rensselear Society of Engineers. Married August 19th, 1879, Hattie E. Harris, daughter of B. F. Harris, of Rochester, N. Y. One child. P. O. address, room 52 Montauk Block, Chicago, Ill.

WILLIAM PIERCE DENEGRE, A. B., C. E., son of James D. and Sylvanie (Blanc) Denegre, was born in New Orleans, La., June 15th, 1853. Prepared at St. Johns College, Fordham, New York City, and entered the Institute September, 1873. Became member of the firm of A. J. Cameron & Co., New York city, November, 1879. Received degree of A. B. from St. Johns College, Fordham, N. Y. Married, Feburary 4th, 1880, Mamie R. Miller, daughter of William S. Miller, of Fredericksburg, Md. Two children. P. O. address, 92 Market street, Chicago, Ill.

ALBYN PRINCE DIKE, C. E., (Skidmore, Nodaway county, Mo.,) son of James P. and Harriette (Allen) Dike, was born in

Brooklyn, N. Y., April 30th, 1855. Prepared at Brooklyn Polytechnic Institute, and entered the Institute September, 1873. Entered his profession January, 1879; to June, 1879, in service of Mississippi river improvement, Lake Providence, La. June, 1879, to November, 1879, Missouri river improvement, Leavenworth, Kan., to St. Joseph, Mo.; November, 1879, to Apríl, 1880, engineer on K. C., St. J. & C. B. R. R., St. Joseph, Mo.; September, 1881, to November, 1881, engineer St. Joseph & Eastern railroad; May, 1880, to May, 1881, stock (live) business, Wyoming Territory; August, 1882, till present time, flour milling, Skidmore, Mo. P. O. address, Skidmore, Nodaway, county, Mo.

HOWARD NIXON ELMER, C. E., son of David Potter and Mary E. (Nixon) Elmer, was born in Bridgeton, Cumberland county, New Jersey, April 27th, 1856. Lived at Bridgeton and attended the West Jersey Academy until 1872, when he spent one year at Genesee Academy, Genesee, N. Y. Entered the Institute September, 1873. Entered upon the work of his professiou Jnly, 1878, as second assistant on United States survey of Mississippi from St. Paul to Lansing, Iowa. At Park Island, Ill., during the winter of 1878 and 1879. June, 1879, in charge of improvements at Smiths Bar, Mississippi river; March, 1880, engineer Grand Tower mining manufacturing company, Grand Tower, Ill.; July, 1880, first assistant engineer on survey for reservoir at headwaters of Mississippi river, at St. Paul, Minn. Summer of 1881, preliminary surveys for St. Paul water works, and improvement of water power, Little Falls, Minn.; March, 1882, entered the firm of Elmer & Newell, civil engineers and contractors, St. Paul, Minn. In July, 1883, made surveys and examinations for sewerage of Duluth, Minn. Designed and built dams for improvement of navigation in the Mississippi river at Smiths Bar, Wis. Inspector of buildings and sanitary matters pertaining thereto, for St. Paul, Minn. Member American Association for the advancement of Science, Engineers Club of Philadelphia, Pa., and Civil Engineers Society, of St. Paul, Minn. P. O. address, P. O. Box 276, St. Paul, Minn.

HENRY RAMSEY GRIFFEN, C. E., (Phœnixville, Pa.,) son of John and Mary E. (Leggett) Griffen, was born in Phœnixville, Chester county, Pa., August 23d, 1857. Resided in Phœnixville until

1861, in Buffalo, N. Y., from 1861 to 1867, in Philadelphia, Pa., from 1867 to 1869, in Phœnixville since 1869. Educated in the public schools; during 1871–72 attended H. D. Lauderbach's Academy, Philadelphia; during summer and fall of 1872 was in Phœnix Iron Co.'s machine shop at Phœnixville. Entered Institute September, 1873. Became a member of the firm of Beerbower & Griffen, manufacturing potters, Phœnixville, Pa., in 1877; still in same place and business, but as member of the firm of Griffen, Smith & Co. Married, March 8th, 1883, Catharine Stewart Love, daughter of J. Stewart Love, of Philadelphia. P. O. address, Phœnixville, Pa.

CHARLES GREENLEAF GRIFFITH, B. S., C. E., son of Walter S. and Caroline V. (Call) Griffith, was born in Brooklyn, N. Y., July 5th, 1854. Prepared with George B. Goodell, and entered the Institute September, 1873. Entered upon the work of his profession April, 1878, as assistant engineer on New York Elevated railroad, remaining until November, 1879; assistant engineer Little Haven & Dakota railroad, until January, 1878. in charge of location and construction of Denver & Rio Grande railroad during winter of 1881–82; at present city engineer of Fort Benton, M. T., and in private practice. Engaged in sheep raising in Montana, from April, 1880, to September, 1881. Received degree of B. S. from Norwich University. P. O. address, Fort Benton, M. T.

THOMAS TAYLOR JOHNSTON, C. E.; (Washington, D. C.,) son of Alexander and Margaret A. (Taylor) Johnston, was born in Cincinnati, Hamilton county, O., August 8th, 1856. Prepared by J. W. Hunt, Washington, D. C., and entered the Institute September, 1873. From Janurary 1st to June 30th, 1878, engaged upon drainage of lakes in monument grounds in Washington; July 24th, 1878, connected with improvement of Mississippi river and tributaries; spent two years in the field on surveys; since January 1st, 1884, has been employed as assistant engineer to the Mississippi river commission, being principal assistant in aiding the commission to determine the helght to which levees should be carried to restrain floods in the lower Mississippi valley. 1886, United States assistant engineer in charge of improvement of the Gasconade river. Member of Rensselaer Society of Engineers. Married, August 17th, 1876,

Wilhelmina Breuninger, daughter of William Breuninger. Two children living. P. O. address, 1,415 Washington avenue, St. Louis, Mo.

ANTONIO LAVANDEYRA, B. S., C. E., (New York city,) son of Francisco and Eloisa (Ros) Lavandeyra, was born in Havana, Cuba, June 13th, 1855. Prepared at the Lycee St. Louis, Paris, for the Ecole Centrale where he remained two years, and left before entering final year on account of illness. Entered the Institute December, 1876. October 3d, entered employment of Delaware bridge company, but left in December for United States of Colombia; returned in June, 1878; sent to Trinidad, remaining until December; then went to Cuba; inspector of steel for G. S. Morrison, on Plattsmouth Bridge until April, 1880; went to Mexico on matters pertaining to railroads; returned and established himself in New York city as consulting engineer and contractor; made improvements in navigation of Magdelena river. Made Bachelor of Science by the French Academy; Constructing Engineer by the Ecole Central. Married in Mexico City, June 10th, 1880, Lucila Cespedes de Aguero, daughter of Melchor Aguero. One child. P. O. address, Washington Building, No. 1 Broadway, New York city.

GEORGE THOMAS NELLES, C. E., son of George W. and Sarah Virginia (Hobbs) Nelles, was born at Muscatine, Muscatine county, Iowa, April 15th, 1856. Attended public and private school at Leavenworth, Kan., and entered the Institute September, 1873. Commencec work in August, 1877, as assistant engineer on Kansas City, St. Joseph & Council Bluff railroad, at St. Joseph, Mo., remaining about one year. From fall of 1878, to spring of 1881, he was connected with the United States government improvement on the Missouri river; as rodman, assistant, and finally as assistant civil engineer, in charge of the works of improvement at Leavenworth and Atchison, Kan. Resigned in June, 1881, to engage in the electrotype business, at Leavenworth, Kan., and Denver, Col. Took up professional work again in March, 1884, as city engineer of Leavenworth, Kan., where he is at present. Member Rensselaer Society of Engineers. Married, February 15th, 1881, Jessie Lena Ralston, daughter of William H. Ralston. One child. P. O. address, Leavenworth, Kan.

WILLIAM ALEXANDER NICHOLSON, C. E., son of Clark A. and Caroline M. (Bryan) Nicholson, was born in Beekman, Duchess county, N. Y., January 19th, 1857. Attended district school and entered the Institute September, 1873. Employed in the United States assay office in New York, from July, 1878, to April, 1879. Has been assayer for the North Eastern gold and silver mining company, and the Canada consolidated gold mining company. In the employ of the Ball electric light company since March, 1883. P. O. address, Beekman, Duchess county, N. Y.

ADOLPHUS WASHINGTON RAHT, C. E., son of Julius E. and Matilda (Dombois) Raht, was born at Ducktown, Polk county, Tenn., September 18th, 1855. Prepared at Virginia military Institute, Lexington, Va., and entered the Institute September, 1873. From January till October, 1878, draughtsman, Pictet artificial ice company, New York; rodman on Missouri river improvement, Atchison, Kan., and Mississippi river at Point Pleasant, Mo. From May, 1879, to March, 1883, locating engineer on the Burlington & Missouri railroad, in Nebraska. At present engaged in stock raising. P. O. address, Gainesville, Cook county, Texas.

ROBERT ROBINSON SINGER, C. E., (Pittsburg, Pa.,) son of John F. and Mary (Snyder) Singer, was born June 11th, 1855, Entered the Institute September 14th, 1873. Was employed at the Edgar Thomson steel works, Bessemer, Pa., from July 12th, 1878, to August 15th, 1880. At present engaged in erecting an office building on Fourth avenue, Pittsburg. Member of American Institute of Mining Engineers. Abroad from June 16th, 1877, to July 1st, 1878; also from July 23d, 1881, to November 4th, 1881. Went around the world via San Francisco, July 29th, 1882, returned to New York November 1st, 1883. P. O. address, 83 Water street, Pittsburg, Pa.

SEYMOUR WILCOX TULLOCK, C. E., (Washington, D. C.,) son of Thomas Logan and Emily E. (Rogers) Tullock, was born in Portsmouth, Rockingham county, N. H., April 5th, 1855. Prepared by Charles B. Young, of Emerson Institute, Washington, D. C., and entered the Institnte in 1873. After graduation, accepted position of assistant engineer on the United States Hot

Springs commission, Hot Springs, Ark. Remained with commission until September, 1877, when he went to Madison, Wis., as assistant professor of civil engineering, State University of Wisconsin, and was also engaged upon the maps of the state geological survey; January, 1879, accepted the position of financial clerk of Washington city post office; promoted to the position of cashier July, 1880. Upon the death of his father, then postmaster, June 20th, 1883, was designated by the bondsmen and appointed by the postmaster general, to act as postmaster until an appointment was made. Aide United States coast survey of Mt. Desert Island, Maine, during the summer of 1874; junior warden of the parish of St. James, Washington, D. C.; representative to diocesan convention of Maryland; secretary Heisler electric light company, Washington, D. C.; director associated charities; executive committee Graceland cemetery association; treasurer United States electric light company; secretary of the Association for Works of Mercy, Washington, D. C. Member of the board of examiners of the United States Civil Service Commission for Washington city post office. Married, November 22d, 1882, Tessie S. Hildrup, daughter of W. T. Hildrup, of Harrisburg, Pa. One child. P. O. address, P. O. department, Washington, D. C.

WILLIAM GEDNEY WALBRIDGE, C. E., son of Henry T. and Esther M. (Knickerbacker) Walbridge, was born in Saratoga Springs, N. Y., April 16th, 1856. Prepared at the Williston Seminary, Easthampton, Mass., and Riverview Military Academy, Poughkeepsie, N. Y., entering the Institute September, 1873. In the summer of 1877, he was on P. W. & Ky. R. R., from Steubenville, O., to Wheeling, W. Va.; assistant engineer of the United States Hot Springs and commissioner of Hot Springs, Ark., from the fall of 1877, until the expiration of his commission in 1878; topographer with United States geological survey, west of 100th meridian, and also with Missouri river survey under Col. Suter; assistant engineer of the Hudson river survey at Albany, at the time of its transfer to New York; afterwards with the Midvale steel works, Pennsylvania; then assistant engineer with Wilson Bros. & Co., civil engineers and architects, Philadelphia, Pa. At present he is assistant engineer in the department of surveys, of Philadelphia, Pa. Member of

the Engineers Club, of Philadelphia, Pa. Married, October 11th, 1881, Esther Oden Schäffer, who died 1885. One child. P. O. address, 5,121 Adams street, Germantown, Pa.

JOSEPH EDWARD WALTZ, C. E., son of Philip Jacob and Catharine B. (Imbush) Waltz, was born in Dayton, Montgomery county, O., October 7th, 1855. Prepared at St. Mary's Institute, at Nazareth, near Dayton, O., and entered the Institute September, 1873; August 24th, 1877, he took position under F. H. Saylor, on the Pittsburg & Lake Erie railroad; 1878, was appointed city civil engineer, Dayton, O., which position he held until May 1st, 1884. Member of the Rensselaer Society of Engineers. P. O. address, 637 Wayne street, Dayton, O.

CHARLES GOUVERNEUR WEIR, C. E., son of Robert W. and Susan N. (Bayard) Weir, was born at West Point, Orange county, N. Y., April 18th, 1851. Instruction under private tutors. Entered the Institute September, 1874. In the field in 1870, Delaware, Lackawanna & Western railroad, rodman; 1870, construction of Chenango Valley railroad; spring of 1871, assistant engineer in department of docks in New York; 1872, opened surveyor's office in Nyack, N. Y.; 1876-77, in government employ on improvement of upper Hudson river; 1877-78, assistant engineer on New York Elevated railroad; 1878-81, assistant engineer under Gen. Newton, on improvement of rivers and harbors around New York; 1881-82, exploration and surveys on Northern Michigan Peninsula. Since then has been raising and ranching cattle in Wyoming Territory; at present United States engineer. Member of American Society of Civil Engineers and American Institute Mining Engineers. P. O. address, Army Building, New York city.

CLIFTON GERALD WILLIAMS, C. E., (Cincinnati, O.,) was born in New York city, October 7th, 1853. Entered the Institute September, 1873. Has been division engineer St. Paul & Milwaukee railroad; also assistant engineer Union Pacific railroad. P. O. address, St. Paul, Minn.

HORACE GREELEY YOUNG, C. E., son of Coe F. and Mary A. (Cornell) Young, was born in Honesdale, Wayne county, Pa., January 26th, 1854. Attended the Edwards Place School, Stock-

bridge, Mass., and entered the Institute in September, 1873. In 1877, he engaged in milling in Southern Colorado; May, 1879, he entered the service of the Delaware & Hudson canal company as the assistant to the general manager; promoted July 1st, 1883, to assistant general manager, and since to general manager. Associate member of American Society of Civil Engineers. Married, October 12th, 1881, Cornelia L. Hascy, daughter of O. L. Hascy, of Albany, N. Y. One child. P. O, address, Albany, N. Y.

CLASS OF 1878.

WASHINGTON IRVING BABCOCK, B. S., C. E., (Brooklyn, N. Y.,) son of David S. and Charlotte A. (Noyes) Babcock, was born in Stonington, New London county, Conn., September 26th, 1858. Resided in Stonington to 1865; Brooklyn from 1865 to 1886. Graduated from Brooklyn public school No. 11 1872; from Brooklyn Collegiate and Polytechnic Institute 1876, and entered the Institute in September, 1876, division B. Engaged at the Morgan iron works, New York, September, 1878, one year; Tehuantepec Interocean railroad company, Mexico, one year; Delaware river iron ship building and engine works, Chester, Pa., September, 1880, to August, 1885; elected assistant to the president of the Providence and Stonington steamship company, September, 1885. Received degree of B. S. from Brooklyn Collegiate and Polytechnic Institute, 1876. Member of American Society of Mechanical Engineers, and of the Engineers' Club of Philadelphia, and associate of the Institute of Naval Architects, London, Eng. P. O. address, New Pier 36, North River, New York city.

CLARENCE MORSE BARBER, C. E., (Cleveland, O.,) son of Gershom M. and Huldah S. (Seeley) Barber, was born in Berea, Cuyahoga county, O., October 5th, 1851. Removed from Berea to Cleveland, O., in May, 1869. Attended Baldwin University and Cleveland Central High School, and entered the Institute in September, 1873. Surveyed in Bradford oil regions, Pa., April to October, 1877; assistant engineer on the Valley railroad September and October, 1878; engineer for the King iron

bridge and manufacturing company, February, 1879, to April, 1881; chief engineer of the Cleveland, Tuscarawes Valley & Wheeling railroad company, (now the Cleveland, Lorain & Wheeling railroad company,) April, 1881, to present time. Designed and built bridge over the Shenandoah river at Harpers Ferry; railroad lift bridge over Trinity river, Texas; iron bridge at Bedford, Pa., and more than twenty others; also railroad bridges for Cleveland, Lorain & Wheeling railroad, at numerous points. Member of Civil Engineers Club of Cleveland. Married, September 14th, 1881, Minnie K. Brown, daughter of E. Milton Brown, of Troy, N. Y. One son, who died April 30th, 1884. P. O. address, Merchants' National Bank Building, Room 29, Cleveland, O.

ROBERT REMSEN CHADWICK, C. E., (Cohoes, N. Y.,) son of P. R. and A. P. (Congdon) Chadwick, was born in Brooklyn, L. I., September 27th, 1857. Attended private schools in Brooklyn, Troy and Albany, and entered the Institute in September, 1874. Appointed assistant in the Institute, summer term, 1879, remaining until close of summer term 1882. Held the office of city engineer of Cohoes, for one year; after which he was engaged in a survey for a water supply for that city until December, 1883; also designed and built a frame dwelling house during this time. Opened and graded public roads and sewers in the city of Cohoes. P. O. address, Cohoes, N. Y.

HARRY BREWERTON DUANE, C. E., son of Col. James E. Duane, of the United States Army Engineer Corps, was born at Baltimore, Md., August 4th, 1856. Resided in Portland, Me., before entering the Institute in 1873. After graduation he entered the light house department in the first district. Is at present employed in the XIIIth district. P. O. address, Tompkinsville, L. I., N. Y.

GEORGE STEWART DAVISON, C. E., son of Edward and Isabella (Kennedy) Davison, was born in Pittsburgh, Allegheny county, Pa., September 21st, 1856. Prepared for the Institute in the public school of Pittsburg, and entered in September, 1874. Entered the service of the Pennsylvania railroad company immediately after graduating, as rodman; left that position in July, 1879, to join a United States engineering party, engaged

in hydrographical survey, at Pine Bluff, Ark.; acted as transitman until January, 1879, when he was transferred to another government party engaged in making a survey of the Missouri river, where he remained until September of that year, as draughtsman ; then entered the service of the Mississippi river commission as first assistant to W. H. Powless, C. E., United States assistant engineer, and was placed in charge of the hydrographical observations at Fulton, Tenn.; in April, 1880, he returned to railroad work, with the Atchison, Topeka & Santa Fe railroad, as draughtsman, and afterward as track supervisor for the Pennsylvania company; in July, 1882, took charge of the engineering department of the Pittsburgh, Chartiers & Youghiogheny railroad company, which position he still holds. Designed a part of the Pittsburgh, Chartiers & Youghiogheny railroad and its bridges and had charge of the building of the entire line. Member of the Engineers Society of Western Pennsylvania. Married, May 19th, 1881, Clara E., daughter of F. A. Lape, of Troy, N. Y. P. O. address, 60 Fourth avenue, Pittsburgh, Pa.

JOHN EWENS, C. E., son of Hugh and Hannah (Gibson) Ewens, was born in Troy, Rensselaer county, N. Y., October 2d, 1854. Prepared under Rev. Francis Harrison, and entered the Institute in September, 1874. Began his professional career September 13th, 1878. During 1878 he was connected with improvements of the Missouri river at St. Joseph, Mo.; 1879, with the hydraulic investigation on the upper Mississippi river; was stationed at Winona, Minn. ; 1882, chief engineer in charge of the physical and hydraulic investigations of the Mississippi river, Atchafalaya river and Red river, with headquarters at Red River Landing, La. During 1882, made a special survey and examination of the Atchafalaya river from its head to the foot of Alabama Id., to determine rate of enlargement. In the spring of 1883 was placed in charge of the general work from St. Louis to New Orleans. The latter work embraces charge of the water guages of the Mississippi. During the great flood of 1884, he determined the discharge of the Mississippi at Hays Landing, Miss., Red River Landing, La., and Carrollton, La. The discharge of the St. Francis and Yazoo rivers was also de-

termined. P. O. address, 2828 Washington Avenue, St. Louis, Mo.

ALBERT COVINGTON FOWLER, C. E., LL. B., son of Samuel and Jane S. (Dufief) Fowler, was born in Washington, D. C., April 10th, 1857. Prepared for Princeton College by Charles B. Young, principal of Emerson Institute, Washington, D. C., but changed his plans and entered the Institute September, 1874. Entered upon the practice of engineering September, 1878, as assistant United States engineer at St. Louis and Omaha, remaining one year; then resigned and went to the mines of Colorado, where he remained six months. Returned to Washington, D. C., and began the study of law, December, 1879. In summer of 1880 was appointed examiner of patents in the United States patent office, electrical department. June, 1882, admitted to the bar of the Supreme Court of the District of Columbia, after receiving degree of LL. B. from Columbia University. He is now engaged in the practice of patent law as a profession. P. O. address, 616 F. street, N. W., Washington, D. C.

EUGENIO DE LACERDA FRANCO, C. E., son of Bento de Lacerda and Manoella de Assis C. Franco, was born at Itatiba, province of San Paulo, Brazil, S. A., November 13th, 1858. Prepared by private tutors in the United States, and entered the Institute September, 1874. Entered upon the work of his profession in November, 1878, in extension of the Paulista railroad, and in May, 1879, took charge of his coffee plantation in Araras, where he still remains. Member of the Municipal Commission. P. O. address, Araras, Province of San Paulo, Brazil, S. A.

GEORGE EDWARD FRITCHER, C. E., (Sharon Springs, N. Y.), was born in Sharon Centre, September 19th, 1852, and entered the Institute in 1874. In 1878, assistant engineer Burlington & Missouri railroad, Nebraska; 1881, division engineer D. S. P. & P. railroad, Alpine, Col.; 1882, assistant engineer International railroad, city of Mexico, Mexico; 1886, division engineer of the Autofagasta railroad, Chili, S. A.

WALTER ALLEN GEARN, C. E., (Newburgh, N. Y.), was born in Newburgh, June 24th, 1854, and entered the Institute in 1874. P. O. address, Newburgh, N. Y.

FREDERIC GEORGE GOETZMAN, B. S., C. E., son of Frederic and Saloma (Feiock) Goetzman, was born at Rochester, Monroe county, N. Y., January 8th, 1854. Graduated with the degree of B. S. from the University of Rochester, class of 1874, and entered the Institute in September, 1874. Assistant engineer of Leighton bridge and iron works company, July, 1878, to April, 1881; assistant engineer, Denver & Rio Grande railroad, April, 1881, to December, 1881; assistant city engineer, Denver, Col., December, 1881, to March, 1883; since that time civil engineer, Denver, Col. Member Denver Society of Civil Engineers. P. O. address, Room 11, Union Depot, Denver, Col.

JOSEPH SIRE GREENE, C. E., was born in St. Louis, Mo., January 15th, 1856, and entered the Institute in 1875. Mining engineer. P. O. address, Leadville, Col.

KANAME HARAGUCHI, C. E., son of Kensuke and Nui (Matswo) Haraguchi, was born in Nagasaki, Japan, November 7th, 1851. Prepared at University of Tokio, Japan, and entered the Institute September 17th, 1875. Entered the service of the Delaware bridge company, New York, in September, 1878, remaining one year. From September, 1879, to June, 1880, with the Pennsylvania railroad company, Philadelphia, Pa. November, 1880, was appointed city engineer of Tokio, Japan, in charge of general public works of the metropolis and its suburbs. In May, 1883, was appointed consulting engineer of the District of Tokio, and assistant commissioner and civil engineer of the Bureau of Railways, in charge of Tokio-Yokohama section of the I. G. railroad. In August, 1884, was appointed general superintendent of public works of the District of Tokio, still retaining the other position. Designed and built the first wrought iron bridge in Tokio, a highway bridge, longest span 120 feet, style double Warren lattice; also at Asakusabashi, a highway bridge, span 84 feet, style bowstring; a wooden bridge in the district of Yamanashi, span 180 feet, style Howe truss; Shinagowa-Shinjiku section of Tokio suburban railroad, six and one-quarter miles long; new water works for Imperial palace now in course of construction in the city of Tokio. At present professor in the university of Tokio, and civil engineer to the government of Japan. Member of Rensselaer Society of Engi-

neers and Japanese Society of Civil Engineers. Has translated into Japanese Rankine's "Steam Engine," published by the Educational Department of Japan. Married, May, 1881, Yei Watase, daughter of Seizo Watase, of Tokio. One child. P. O. address, Tokio Fu, Tokio, Japan.

SEJIRO HIRAI, C. E., son of one of the Imperial Judges of Japan, was born in Ishikawa, Keno, Japan, November 16th, 1856. He prepared for the Institute at the University of Tokio, and at a school in Hartford, Conn. After he was graduated he was assistant engineer on the Mississippi river improvement under the United States government, where he remained three years. He then returned to Japan by way of Europe, visiting many important institutions and engineering works. After reaching home, was made chief engineer of the Poronai railroad. He was married about 1883. Wife deceased. One child living. P. O. address, Sapporo, Japan.

HARRY SEYMOUR HODGE, C. E., son of Samuel F. and Elizabeth Hodge, was born in Detroit, Mich., April 21st, 1856. Prepared himself, and for two years previous to entering the Institute was employed in the draughting office of the Michigan iron foundry in Detroit. Entered the Institute in September, 1874. From September, 1878, to May, 1883, was superintendent of Lake Superior iron works, at Houghton, L. S. Mich. Is now president and treasurer of "Samuel F. Hodge & Co.," incorporated, manufacturing marine and stationary engines, mining machinery, and doing a general machinery business. Married, August 7th, 1879, Carrie H. Wright, daughter of T. W. Wright. One child. P. O. address, 320 Atwater street, Detroit, Mich.

WILLIAM HARRISON MCKNEW, C. E., was born at Washington, D. C., October 3d, 1855, and entered the Institute in 1874. In 1878, assistant engineer on Missouri river improvement, Council Bluffs, Iowa; 1881, the same, Plattsmouth, Neb.; 1884, the same, St. Joseph, Mo. P. O. address, St. Joseph, Mo.

DANIEL MCLAREN, C. E., son of Daniel and Amelia E. (Jenkins) McLaren, was born at Cincinnati, O., April 22d, 1855. Prepared at Chickering Institute, Cincinnati; was apprenticed, June, 1871, at machinist's trade; journeyman, June, 1874; loco-

motive engineer, June to September, 1874, when he entered the Institute. Began the practice of his profession November 1st, 1881, as inspector of machinery of the Cincinnati, New Orleans & Texas Pacific railroad company; resigned March 18th, 1882. April 1st, 1882, to December 26th, 1883, general superintendent of the Cincinnati, Selma & Mobile railroad. January 1, 1884, to date, superintendent of the Alabama Great Southern railroad. Foreman Home Street machine works, January, 1879 to 1880; deputy sheriff, Hamilton county, O., January to September, 1880. Under his direction was built the Cincinnati, Selma & Mobile railroad, from Greensboro to Akron, Ala., seventeen and one-half miles, completing the gap between Selma and Akron; reconstructing old line from Greensboro to Selma. Member of Rensselaer Society of Engineers. Married, July 11, 1878, Lucy G. Cunningham, daughter of James F. Cunningham. Two children, son and daughter, died of scarlet fever, in December, 1883. P. O. address, Superintendent A. G. S. railroad, Chattanooga, Tenn.

PAUL SABBATON MERRIFIELD, C. E., (New York city,) son of Richard and Josepha (Sabbaton) Merrifield, was born in Albany, N. Y., March 3d, 1858. Prepared at Duane S. Everson's Collegiate Academy, New York city, and entered the Institute September, 1873. After graduating, was employed at Troy gas works until January, 1882; since that time with American meter company, New York city. Built gas works at Hoosick Falls, N. Y., and remodeled gas works at Glens Falls, N. Y. Is a member of the American Gaslight Association. P. O. address, 512 West Twenty-second street, New York city.

HENRY BENJAMIN PATTEN, C. E., son of Horace and Mary Jane (Allen) Patten, was born in Enfield, Hartford county, Conn., January 31st, 1855. Prepared at Hartford High School, and entered the Institute September, 1872. Entered upon the work of his profession September, 1878, on United States survey, Connecticut river, Hartford and Saybrook, Conn., where he remained until April, 1879; United States survey Mississippi river, at Osceola, Ark., and Fulton, Tenn., April to July, 1879; Atchison & Nebraska railroad, Beatrice and David City, Neb., July to November, 1870; Burlington & Missouri river railroad, Neponee and Republican, Neb., November, 1879, to March,

1880; Union Pacific railroad, Omaha and Waterloo, Neb.; surveys in Wyoming and Cheyenne, W. T., from March, 1880, to date. Married, March 9th, 1882, at Enfield, Conn., Emily A. Allen, daughter of Asher Allen, of East Windsor, Conn. Resident engineer Union Pacific railroad, Cheyenne, since December, 1881. P. O. address, Cheyenne, Laramie county, Wy. Ter.

CHARLES FRANKLIN POTTER, C. E., was born at Enfield, Hampshire county, Mass., August 11th, 1857. Prepared at Williston Seminary, Easthampton, Mass., and entered the Institute September, 1875. From September 1st, 1878, to September, 1880, assistant engineer on Missouri river improvement at St. Joseph, Mo., and Nebraska City, Neb.; engineer in charge river improvements at Vermillion, Dak., September, 1880, to October, 1883; engineer in charge at Sioux City, Ia., October, 1883, to June, 1884. P. O. address, 1515 Farnam street, Omaha, Neb.

ALPHEUS TIMOTHY SABIN, C. E., son of E. R. and Amelia N. (Newman) Sabin, was born at Oneonta, Otsego county, N. Y., December 27th, 1855. Prepared at Oneonta High School; did some farm and town surveying before entering the Institute in September, 1873. On account of sickness, was not able to attend the fourth year, but graduated with the class of 1878. His first work was on the survey of the Missouri river at Leavenworth, Kan., from August to December, 1878, when he went to St. Louis, and from there to Columbus, Ky., where he was stationed to take daily observations of the discharge, velocity, &c., of the river. July, 1879, went to work on the Troy & Greenfield railroad, at North Adams, Mass., and had charge of the substructure for a five span bridge across the Hoosac river near that place. December, 1879, at Norwich, N. Y., on the New York, Ontario & Western railroad. March, 1880, was offered the charge of a sub-division under construction on the Texas & Pacific railroad; reported at Fort Worth, Tex., and from there was sent west about two hundred and fifty miles; remained on sub-division until its completion, September, 1880, when he was appointed bridge engineer, and had charge of the construction of the bridges until May, 1881; then at Shreveport, La., in charge of the bridges on the New Orleans Pacific railroad, until October, 1881; then took charge of the bridges on the Chesapeake, Ohio & Southwestern railroad, which position he held

until March, 1882, when he was appointed division engineer of the road. Remained on this road until completion, January, 1883, when he went to Louisville, Ky., as principal assistant engineer on the Louisville Elevated railroad. June 20th, 1885, superintendent road department, Chesapeake, Ohio & Southwestern railroad company. Married, December 18th, 1882, Anna V. Davis, daughter of William Davis. P. O. address, corner Thirteenth and Rowan streets, Louisville, Ky.

JUAN SEMINARIO Y LEON, C. E., was born December 6th, 1854, at Piura, Peru, S. A. Entered the Institute in September, 1873., but owing to ill health, did not graduate until 1878. He returned soon afterwards to Peru, and is reported to have been killed in one of the revolutions.

ALBERT JOSEPH SELIGMAN, C. E., M. E., son of Jesse and Henrietta (Hellman) Seligman, was born in New York city, February 24th, 1859. Prepared by Professor Everson, Harvard Grammar School, New York city. Residence, New York city, and entered the Institute in September, 1874. Went to Montana in 1881, and became connected with the Gregory consolidated mining company, Helena, Montana Territory. Mining engineer, New York city. Received degree of Mining Engineer from Royal School of Mines, Freiberg, Germany, and also from Royal School of Mines, Liege, Belgium. Member of American Institute Mining Engineer and Society Scientific, at Liege, Belgium. P. O. address Mills Building, New York city.

EDWARD CLAPP SHANKLAND, B. C. E., C. E., (Dubuque, Ia,,) son of E. R. and E. F. (Clapp) Shankland, was born in Pittsburgh, Allegheny county, Pa., August 2d, 1854. Prepared at Iowa State Agricultural College, Ames, Ia., and Cornell College, Mt. Vernon, Iowa. Entered the Institute in September, 1875. From August, 1878, to April, 1883, on United States improvement of Missouri and Mississippi rivers, Nebraska City, Neb.; Missouri river survey, Kansas City, Mo., and at Carrollton, La. In charge of improvements at Lexington, Mo., two years; principal assistant engineer on Leavenworth division. Since April, 1883, assistant engineer Wrought iron bridge company, Canton, O. Member of Rensselaer Society of Engineers and Western Society of Engineers. Married, July 19th, 1879, Harriet S. Gra-

ham, daughter of A. H. Graham. One child. P. O. address Canton, O.

RICHARD EDWARD SHAW, C. E., son of Charles B. and Isabella, (Watson) Shaw, was born at Charlottesville, Albemarle county, Va., November 26th, 1855. Prepared at Emerson Institute, Washington city, Westfield High School, Mass., and at Charlottesville under Major Jones. Entered the Institute September, 1873. After graduation spent one year abroad traveling. Then for two years was assistant engineer and draughtsman on the Richmond & Allegheny railroad in Virginia, and three years as resident engineer and division engineer's assistant on Georgia Pacific railroad, in Georgia and Alabama. In 1883 went into Elevator Mills at Athens, Ga. Designed various bridges, high trestles and other works on the two roads named above. Married, November 13th, 1883, Margaret E. Smith, daughter of Gen. Martin Luther Smith, late chief of engineers of staff of Gen. R. E. Lee, C. S. A. P. O. address, Athens Grain Elevator, Athens, Ga.

WILLARD FILLMORE SHEPHERD, C. E., M. D., son of Alfred and Martha Ann (Crane) Shepherd, was born at Springfield, Hamilton county, O., June 23d, 1854. Prepared at Hughes High School, Cincinnati, O. Entered the Institute in September, 1874. August, 1878, commenced on government survey of Missouri river; afterwards under Mississippi river commission, on Mississippi river, from Cairo to Memphis; later, on Greeley, St. Louis & Pacific railroad in Colorado, under Union Pacific railroad. Commenced the practice of medicine April, 1882, in Glendale, O. Married, August 31st, 1882, Mary V. Keys, daughter of Richard W. Keys. One child. P. O. address, Glendale, Hamilton county, O.

CHARLES RAYMOND SMITH, C, E., son of Robert A. T. and Mary L. (Raymond) Smith, was born at Albany, N. Y., January 21st, 1858. Resided with parents at East Albany, and attended district school at Bath-on-the-Hudson. Entered the Institute in September, 1874. Entered upon the work of his profession, December, 1878, at Camocina, Ceara, Brazil, and spent nearly three years there as assistant engineer on Sobral railroad; after a year of work in technical office, was placed in charge of con-

struction of buildings; was one year and a half in charge of nine miles of grading work on St. Louis & Pacific division of St. Louis & San Francisco railroad in Missouri. Three months in charge of survey party on Kansas City division, United States improvement, Missouri river. Has been employed for about fifteen months as assistant engineer on Union Pacific railroad, Portland and Yakima divisions; worked about five weeks in winter of 1883, in bridge gang of carpenters; also did considerable land surveying and locating of claims in Cowlitz county, W. T., in spring of 1884; built the Estacao Central da estrada de Sobral, a brick depot; also engine house, car shop and freight house, and partially completed some large machine shops for the Sobral railroad, in Brazil; built the temporary inclines at Kalama, Cowlitz county, W. T., for Northern Pacific railroad; also East and West Yakima inclines. In conjunction with the last work, has built about two miles of road, running from the incline on east bank of river to junction of Yakima division, with main line at Pasco Junction, where his office is at present, and where he is in charge of terminal buildings. Married, May 31st, 1880, Nellie, daughter of J. C. Parks, of Bath-on-the-Hudson. One child. P. O. address, Pasco, Franklin county, W. T.

HERMAN STUTZER, JR., C. E., son of Herman and Martha (Woodward) Stutzer, was born at Brooklyn, N. Y., August 1st, 1857. Prepared at Methfessel Institute, Stapleton, Staten Island, N. Y., and entered the Institute September, 1873. In February, 1879, entered as clerk in the exporting and importing business with G. Amsink & Co., New York city. Since 1880 in the grain business, buying for export. Married, October 2d, 1884, Helen M. Ford, daughter of DeWitt Ford, of Oneonta, N. Y. Since graduating has traveled extensively in the far west and looked into mining industries; has also taken an active interest in National Guard affairs, having served time in the 23d regiment N. Y. P. O. address, 25 First Place, Brooklyn, N. Y.

GEORGE EDWARD THACKRAY, C. E., (Brooklyn, N. Y.,) son of Richard and Emma (Stern) Thackray, was born in Boston, Mass., November 9th, 1856. Prepared at Brooklyn Collegiate and Polytechnic Institute, and entered the Institute September, 1875. January, 1879, to October, 1880, assistant engineer Springfield iron and steel company, Springfield, Ill. October,

1880, to June, 1881, assistant engineer in charge of surveys on improvement of Missouri river at St. Charles, Mo. June 1st, 1881, to February, 1882, assistant engineer in charge of surveys and construction, improvement of Missouri river at Leavenworth, Kan. During summer and autumn of 1882, United States assistant engineer in charge of improvements on Missouri river at Leavenworth, Kan. December, 1882, to October, 1883, assistant engineer and steel melter for Youngstown steel company; October and November, 1883, assistant engineer Chicago, Rock Island & Pacific railroad, at Davenport, Ia.; December, 1883, to date, superintendent Youngstown steel company, Youngstown, O. Member American Institute of Mining Engineers and junior member American Society of Civil Engineers. P. O. address, Box 153, Youngstown, O.

FRANK WRIGHT TUTTLE, C. E., (New Marlboro, Mass.,) son of Ira N. and Elizabeth S. (Wright) Tuttle, was born in Lee, Berkshire county, Mass., April 8th, 1858. Prepared at South Berkshire Institute, and entered the Institute in September, 1874. Entered upon the work of his profession September, 1878, in Nebraska City, Neb., one month; Pine Bluff, Ark., six months; St. Louis, Mo., two months; Nebraska City, Neb., three months; Mississippi river survey, six months; Glasgow, Mo., four months; Pine Bluff, Ark., eight months; Black river, Ark., six months; Pine Bluff, Ark., four months; St. Charles, Mo., six months; Kansas City, Mo., fourteen months. Employed until June, 1883, on United States improvement of western rivers; since that date in office of city engineer of Kansas City, as draughtsman. Member of Kansas City Engineers Club. Married, May 17th, 1882, Martha W. Simmons, daughter of William A. Simmons. One child. P. O. address. 1,015 Lydia Avenue, Kansas City, Mo.

EDMUND FRENCH VAN HOESEN, C. E., son of J. W. and Margaret (Ostrander) Van Hoesen, was born at Castleton, Rensselaer county, N. Y., June 24th, 1855. At various boarding schools until September, 1873, when he went to Williston Seminary, taking a special course to prepare for Yale Scientific School; in fall of 1874, passed his entrance examination at Yale Scientific School, but being in poor health returned home, and decided to enter the Institute, which he did in fall of 1874. In

fall of 1878, went to work under D. W. Church, on Missouri river improvement, opposite Fort Leavenworth, Kan., but in January was called home by the dangerous illness of his father. In July, 1879, entered employ of the Pennsylvania railroad company, office of chief engineer in Philadelphia, where he remained until January 1st, 1883, when he accepted position of assistant engineer, department of public parks, New York city; resigned this position April 1st, 1883, to return to the Pennsylvania railroad, where he is now employed as assistant engineer. P. O. address, Office Chief Engineer, Pennsylvania railroad, 233 South Fourth Street, Philadelphia, Pa.

CHARLES WIGGINS, C. E., son of Charles and Virginia (Mullikin) Wiggins, was born in St. Louis, Mo., July 23d, 1857. Prepared at Phillips Academy, Andover, Mass., prior to that was three years abroad, studying and traveling. Entered the Institute in September, 1874. Treasurer of St. Louis dock and warehouse company. P. O. address, 418 Chamber of Commerce, St. Louis, Mo.

FREDERIC AUGUSTUS YEAGER, C. E , son of Christian and Elizabeth Esther (Harman) Yeager, was born at Pittsburgh, Allegheny county, Pa., January 9th, 1855. Entered the Institute in September, 1873. October 15th, 1878, he started as recorder on government survey at Choctaw Reach, Mississippi river, and with the exception of about nine months was in the employ of Mississippi River Commission until March 12th, 1885. At Choctaw Reach as recorder nine months; at Lake Providence as recorder, one year; at Prescott, Wis., one year; as assistant engineer in charge of gauging party; at Helena, Ark., about one year as assistant engineer in charge of gauging party, and at Plum Point, about two years as assistant engineer on construction. At present. engineer Columbia iron works. P. O. address, 508 Market Street, Pittsburgh, Pa.

CLASS OF 1879.

KENNETH ALLEN, C. E., (Sherburn, Mass.,) son of Edward A. H. and Eugenia S. (Tenlon) Allen, was born in New Bedford, Bristol county, Mass., April 6th, 1857. Remained at New Bedford until the summer of 1872, when he went to Madison, Wis., and spent a year in the preparatory school of the University of Wisconsin. The next year was spent at the West Newton (Mass.) English and Classical School, which he left to enter the Institute in June, 1874. July, 1875, to August, 1877, Boston water works, Sudbury river, Framingham, Mass.; August, 1879, to September, 1879, Essex county, Lawrence, Mass.; September, 1879, to February, 1881, Kansas City, St. Joseph & Council Bluffs railroad, St. Joseph, Mo.; Feburary, 1881, to May, 1881, Missouri Pacific railroad, Mineola, Texas; May, 1881, to May, 1882, building department, Atchison, Topeka & Santa Fe railroad, Topeka, Kan.; May, 1882, to May, 1883, Pittsburgh, McKeesport & Youghiogheny railroad, Pittsburgh, Pa; May, 1883, Philadelphia water department of surveys, Philadelphia, Pa. In charge division 2, Nodaway Valley railroad; division 3, Tarkio Valley railroad, (branches of K. C., St. J. & C. B. railroad); division 4, Greenville, Mineola extension of Missouri Pacific railroad; made designs for masonry for Pittsburgh, McKeesport & Youghiogheny railroad. 1886, civil engineer, iron and steel structures, Kansas City, Mo. Member of Engineers Society Western Pennsylvania, (resigned January, 1884), Rensselaer Society of Engineers, and Engineers Club of Philadelphia. Married, 1886, Rose Switzer, of Philadelphia, Pa. P. O. address, Kansas City, Mo.

ROBERT RUFUS BRIDGERS, JR., C. E., (Wilmington, N. C.), son of Robert Rufus and Margaret E. (Johnston) Bridgers, was born in Tarboro, Edgecomb county, N. C., December 1st, 1854. Prepared at Bingham School, Mevaneville, N. C.; Virginia Military Institute, Lexington, Va., and College of New Jersey, Princeton, N. J., entering the Institute in February, 1876. Entered upon the work of his profession in June, 1879. Two years engineer in charge of bridges and culverts, Western & Atlantic railroad,

of Georgia; one year in charge of building Roanake machine workshops, Roanoke, Va.; one year in charge of building shops and terminal facilities for East Tennessee, Virginia & Georgia railroad, Atlanta, Ga. ; 1885, in office of engineer of maintenance of way, Pennsylvania railroad, Altoona, Pa., and at present engineer on New York division of same road. Previous to 1874, he was chainman and rodman, leveler and transitman on several small surveys; also served as freight train brakesman and conductor, also as wood passer on an engine; served as apprentice in Pennsylvania railroad shops at Altoona for several months. P. O. address, Trenton, N. J.

HENRY NEWMAN BRINSMADE, C. E., son of James Beebe and Jennie (Newman) Brinsmade, was born in Brooklyn, N. Y., August 14th, 1857. Prepared at Brooklyn Collegiate and Polyteching Institute, and entered the Institute in September, 1876, in division C. September, 1879, Russell Gulch, Col., mining engineer and assayer to July, 1880; August, 1880, to July, 1882, Lake Mahopac. N. Y., superintendent to Mahopac iron ore company; October, 1882, Everett, Bedford county, Pa., general superintendent for the Everett iron company. Designed development work of Mahopac mines; construction and erection of buildings and machinery for the Everett iron ore company's ore mines, colliery and limestone quarries; opened and built railroad, coke ovens and blast furnace; resigned 1885. Member of American Institute of Mining Engineers. Married, October 11th, 1881, Frances Norsworthy, daughter of Hon. Silas M. Stillwell. One child. P. O. address, 131 West Thirty-first street, New York city.

CHARLES WILLIAM CAMPBELL, JR., C. E., son of Charles W. and Sarah A. (Jones) Campbell, was born near the city of St. Joseph, Buchanan county, Mo., August 5th, 1858. Prepared at St. Joseph Public High School, and entered the Institute in September, 1875. June 24th, 1879, assistant engineer on construction of St. Joseph & Des Moines railroad; January 1st, 1880, assistant on surveys for St. Joseph water works; April 1st, assistant in charge of reservoir construction until November 17th, when he went to Salt Lake, California and Oregon; February 22d, 1881, assistant engineer on the California Southern railroad, National City, Cal., in construction of terminal yards in San

Diego Bay; July 1st, division of engineers, same road; September 15th, track engineer, same road, until January 1st, 1882, when he went to Florida; March 17th, assistant engineer in charge of office on Florida Tropical railroad, Ocala, Florida; transferred to Fernandina, Fla., with Florida Transit railroad; in same capacity, April 1st, 1883, remaining until November, 1883; then returned to Ocala; February 26th, 1884, appointed engineer to Marion land and improvement company, his present position. P. O. address, Ocala, Marion county, Fla.

WILLIAM HOWARD COURTENAY, C. E., was born in Louisville, Ky., May 30th, 1858. Entered the Institute in September, 1874. 1880, assistant engineer, Louisville, Lexington & Cincinnati railroad; 1882, resident engineer, Louisville & Nashville railroad. At present assistant to the resident engineer of the Henderson bridge company, Henderson, Ky. P. O. address, Louisville, Ky.

ELIPHALET WICKES CRAMER, C. E., son of Eliphalet and Electa Rebecca (Fay) Cramer, was born at Milwaukee, Wis., November 14th, 1854. Prepared by Albert Markham, Milwaukee, and entered the Institute in 1875. In April, 1880, at Montezuma, Col., two years. Member of American Institute of Mining Engineers, member of firm of Cramer Brothers, bankers, Chicago. Married, October 24th, 1884, Katharine Clinton Spencer, daughter of James Clinton Spencer. One child. P. O. address, 57 Dearborn street, Chicago.

GEORGE HAWLEY CUSHMAN, C. E., (Brooklyn, N. Y.), son of Charles and Eliza Jane (Kelsey) Cushman, was born in Springfield, Mass., January 17th, 1855. Prepared at High School, Plainfield, N. J., and entered the Institute in the winter session of 1875. July 5th, 1879, to September 20th, 1880, on Brooklyn Elevated railroad; April 24th, 1881, to October 15th, 1881, on Toledo, Cincinnati & St. Louis railroad. Opened a private office in partnership with James Andrew Fairleigh, in Chattanooga, Hamilton county, Tenn., November 26th, 1881; commissioner Fink's office from October 1st, 1880, to April 17th, 1881. Designed and built one narrow gauge (three feet six inches) railroad, from Tennessee river, about three miles above Kingston, Tenn., four miles up the valley of Riley creek to an iron ore mine; one highway bridge, 135 feet span, 18 feet roadway, in

Hamilton county, Tenn. P. O. address, Chattanooga, Hamilton county, Tenn.

JOHN HALL EMIGH, C. E., (Ballston Spa, N. Y.,) son of William W. and Eliza (Hall) Emigh, was born in Malta, Saratoga county, N. Y., November 19th, 1850. Attended State Normal School at Albany, N. Y., graduating in 1871. Taught district school several terms. Entered the Institute April, 1876. For about eight months after graduation was rodman on survey for and construction of Chicago & Strawn railroad in Illinois. The next year and a half engineer and draughtsman for Saratoga Victory manufacturing compary, Victory Mills, N. Y.; one year transitman and draughtsman on survey for Boston, Hoosac Tunnel & Western railroad, western division; spent one year in miscellaneous practice; has since been employed as assistant instructor at the Institute. Married, March 3d, 1880, Emma F. B. Allen, daughter of David Allen. One child. P. O. address, 113 Eighth street, Troy, N. Y.

WILLIAM FRIES ENDRESS, C. E., son of Isaac Lewis and Helen E. (Edwards) Endress, was born in Dansville, Livingston county, N. Y., August 2d, 1855, and received his early education at Dansville Seminary under the close supervision of his father. In 1872 entered the Pennsylvania Military Academy at Chester, Pa., in preparation for the United States naval service; the following year he received his commission as cadet midshipman, and entered the naval academy at Annapolis, Md., where he remained until December, 1875, when ill-health obliged him to resign; in the fall of 1876 he entered the Institute, in Div. C. Soon after graduating he took up his residence in Jamestown, N. Y., and engaged in the coal business. January 1st, 1883, bought out a bituminous coal mine and lease of some three hundred acres of coal land in Butler county, Pa., reached by the Chenango & Allegheny railroad, over which he is now shipping coal to Jamestown, Buffalo and the north and east. Married, August 27th, 1879, Dora Elizabeth Willey, of Dansville, N. Y. One child. By priority of birth, this boy becomes the "Child of the Class of '79," and in recognition of this fact he was presented with the class cup, inscribed "William Fitz Hugh Endress, born July 17th, 1880. A token of regard to our first born. R. P. I. Class of 1879." P. O. address, Jamestown, N. Y.

RICHARD MORLEY HARISON, C. E., (Newark, N. J.,) was born in Augusta, Ga., August 22d, 1856. Entered the Institute 1877. Assistant engineer Baltimore bridge company, St. Louis, Mo.; afterward engaged in business in Liverpool, England.

EDWARD ADOLPH HERMANN, C. E., (St. Louis, Mo.,) son of Charles F. and Lena D. (Wilhelmi) Hermann, was born in Washington county, Ark., December 28th, 1856. Family moved to St. Louis, and he attended the public schools, and for two years at Washington University in that city. Spent one year in Europe, and on his return entered the Institute, in September, 1875. From June to September, 1875, was draughtsman with E. C. Darby, mechanical engineer, St. Louis, Mo.; September, 1879, to January, 1880, assistant engineer Grand Tower mining, manufacturing and transportation company, Grand Tower, Ill.; January 1st, to April 1st, 1880, assistant engineer, bridge department, city engineer's office, St. Louis, Mo.; April 1st to September 1st, 1880, assistant engineer and draughtsman, Atlantic refining company, Philadelphia, Pa.; September 1st, 1880, to October 1st, 1881, assistant engineer Lake Erie & Western railroad, Lafayette, Ind.; October 1st, 1881, to April 1st, 1882, assistant engineer Pennsylvania railroad (P. F. W. & C. railroad and branches), Pittsburgh, Pa.; since that time assistant engineer Cincinnati, Indianapolis, St. Louis & Chicago railroad, Indianapolis, Ind. Member of Society of Civil Enginears of Western Pennsylvania. P. O. address, Assistant Engineer C., I., St. L. & C. R. R., Indianapolis, Ind.

HENRY CLAY JENNINGS, C. E., son of Nathan T. and Maria C. (Ryer) Jennings, was born in Boonton, Morris county, N. J., August 2d, 1858. Prepared at Lawrenceville Academy, Lawrenceville, N. J., and entered the Institute September, 1875. Entered upon the work of his profession October, 1879, in New York city, remaining two months; in Wilmington, Del., three and one-half years; Milwaukee, Wis., seven months. P. O. address, chief engineer's office, C. M. & St. P. railroad, Milwaukee, Wis.

JAMES MORELAND JOHNSON, C. E. son of Alfred B. and Martha (Moreland) Johnson, was born at Owensboro, Davis county, Ky., July 11th, 1857. Prepared at Owensboro High School, J.

H. Gray, principal, and at private engineering school taught by C. R. Bishop, A. B., C. E. Was occupied in surveying for the county of Davies, Ky., and for the corporation of Owensboro, Entered the Institute September, 1876. From July 1st to December 22d, 1879, at Omaha, Neb., and Council Bluffs, Ia., on United States improvement of western rivers, with rank and pay of rodman, duties of transitman. From December 22d, 1879, to March 6th, 1882, in Owensboro, Ky., associated with A. A. Stuart (also of class of '79,) as engineer and contractor. From March 6th, 1882, to March 6th, 1883, at Henderson and Louisville, Ky., in employ of Henderson bridge company and Louisville bridge company ; from that time to date, located at Louisville, Ky., as assistant engineer Louisville & Nashville railroad. For a short time in 1881 served as captain of a small boat plying upon the lower Ohio. Member Rensselaer Society of Engineers. Married, May 31st, 1883, Ella M., daughter of C. B. Hicks, of Owensboro, Ky. P. O. address, 943 West Walnut street, Louisville, Ky.

CONRAD BEHREND KRAUSE, C. E., (Cleveland, O.,) was born March 29th, 1859, in Mansfield, O. Entered the Institute 1875. Accepted position of assistant engineer with the Cleveland bridge and iron works, of Cleveland, O., and later took charge of the bridge department. In December, 1882, severed his connection with the above company, and engaged as contractor for bridges and masonry, in Manitoba. Has lately opened an office in New York city, at 32 Liberty street.

NELSON PETER LEWIS, A. B., C. E., son of John N. and Christina J. (Nelson) Lewis, was born in Annandale, Dutchess county, N. Y., February 1st, 1856. Graduated in 1875 from St. Stephen's College, Annandale, N. Y., and entered the Institute in September, 1875. Took the summer course in assaying at the Institute in 1879, after which he located in Chihuahua, Summit county, Col., where he was engaged in mining surveying and assaying until May, 1881, when he accepted a position as resident engineer in charge of construction on Denver & Rio Grande railroad (Blue river extension), where he remained until the work was abandoned in the winter of 1881–82. April, 1882, resident engineer in charge of construction on Vicksburg, Shreveport & Pacific railroad, in Louisiana, until completion of the road, February, 1884; March, 1884, assistant engineer mainte-

nance of way, Delaware & Hudson canal company's railroad, Ballston, N. Y.; 1886, assistant engineer, Long Island. P. O. address, Ridgewood, L. I.

FRANK ELBERT PLATT, C. E., son of Joseph Curtis and Catharine S. (Scranton) Platt, was born in Scranton, Lackawanna county, Pa., February 21st, 1859. Prepared at Peekskill Military Academy, Peekskill, N. Y., and entered the Institute September, 1875. Engaged on Troy water works, six months, from July, 1879, on construction ; on preliminary survey for New York, Lackawanna & Western railroad, three months, from September, 1880 ; on bridge work for Delaware & Hudson canal company, Albany, N. Y., three months ; with Franklin iron works, Oneida county, N. Y., from May, 1881, to July, 1884, as manager of blast furnaces ; 1884–86, engaged in business in New York city; 1886, superintendent Hudson river ore and iron company's furnace, Cold Spring, Putnam county, N. Y., his present P. O. address. Member of the American Institute of Mining Engineers. Married, June 20th, 1883, Elizabeth A. Skinner, daughter of William Skinner. One child.

HENRY WITBECK POTTER, C. E., son of J. and Katherine E. Potter, was born in Whitehall, Washington county, N. Y., August 26th, 1859. Prepared at Whitehall Union Free School, and entered the Institute September, 1875. Commenced work July 18th, 1879, on Buffalo, Bradford & Pittsburgh extension, remaining until September 1st, 1880. October 30th, 1880, to April 1st, 1883, with Mexican national construction company. May 22d, 1883, in service of Trojes mining and smelting company, limited, as surveyor of mines and assayer. P. O. address, Calle de Cadena, No. 11, city of Mexico.

CHARLES TAYLOR RAYMOND, C. E., son of George A. and Harriet T. (Wasson) Raymond, was born in Troy, April 8th, 1859. Prepared at Troy Academy, and entered the Institute 1875. Immediately after graduation was draughtsman at the Watervliet Arsenal ; at W. & L. E. Gurley's, Troy, N. Y., from November, 1879, to July, 1883 ; superintendent Douglass flouring mill, Lockport, N. Y., and at present Saxton & Thomposon's flouring mills. P. O. address, Lockport, N. Y.

WILLIAM BARRET RIDGELY, C. E., son of Charles and Jane Maria (Barret) Ridgely, was born in Springfield, Sangamon county, Ill., July 19th, 1858. Prepared in the public schools of Springfield, did some work at the machinist's trade, ran a stationary engine for Springfield iron company, and entered the Institute September, 1873. During his course at the Institute spent about two years learning the machinist's trade at the works of the Springfield iron company. Since graduating in 1879, has been in the employ of the same company as clerk, salesman, draughtsman, engineer and superintendent. Was assistant secretary for about one year, and is now assistant manager of the works. Member of the American Institute of Mining Engineers; junior member of the American Institute of Mechanical Engineers. Married, October 24th, 1882, Ella Cullom, daughter of Senator Shelby M. Cullom, of Illinois. One child. P. O. address, Springfield, Ill.

JOAQUIM DE SALLES, C. E., was born in San Paulo, Brazil, S. A., March 28th, 1857. Entered the Institute in the fall of 1875. After graduation he returned home and is engaged as civil engineer at Campinas, San Paulo, Brazil, S. A.

WILLIAM GIBSON SHARP, C. E., son of John and Annie (Gibson) Sharp, was born in Salt Lake City, Utah territory, March 17th, 1857. Prepared with Dr. John R. Park, and entered the Institute in September, 1875. Commencing in June, 1880, was employed one year on the United States geological survey in Colorado and New Mexico in collecting mining statistics for the tenth census; from 1881 to 1883 engaged as assistant engineer on the Utah Central railroad, Utah. Since January, 1883, mining engineer and superintendent of Utah Central railway company's coal mines at Scofield, Utah. P. O. address, Salt Lake City, Utah.

BENJAMIN VERRAZANO SIMPSON, C. E., son of Verrazano and Ann Celia Simpson, was born in Winona, Winona county, Minn., August 20th, 1857. Prepared at Winona public schools, and entered the Institute in September, 1873, and was absent from the Institute two years during his course. From June, 1879, government improvement at Kansas City, for six months; June, 1880, C. M. & St. P. railroad for five months; government im-

provement of the Missouri river from October, 1880, to July, 1883; in charge of survey for Lexington, Kansas City & St. Joseph divisions successively. Member of the Rensselaer Society of Engineers. Married, November 30th, 1881, Mattie L. Kerdolff, daughter of W. F. Kerdolff. One child. P. O. address, Winona, Minn.

CHARLES FREDERICK STOWELL, C. E., (Rochester, N. Y.,) son of Thomas Pollard and Henrietta (Fowler) Stowell, was born in Owego, Tioga county, N. Y., February 28th, 1853. Prepared at Rochester Free Academy, and by Prof. Charles S. L. Sterk. Resided before entering the Institute at Owego, N. Y., Hornellsville, N. Y., and Rochester, N. Y. Insurance agent for two years before entering the Institute, which was in February, 1874. Began work as assistant to Charles Hilton at Albany, N. Y., June, 1879; assistant engineer Hilton bridge construction company from January 1st, 1880, to November 1st, 1882; assistant engineer Louisville bridge and iron company, November 15th, 1882, to February 15th, 1883; assistant engineer Hilton bridge construction company, February 22d, 1883. At present bridge engineer New York board of railroad commissioners. Married, October 10th, 1883, Emily A. Blossom, daughter of Thomas M. Blossom, of Hemlock Lake, Livingston county, N. Y. P. O. address, 15 Jay street, Albany, N. Y.

ALFRED ALLEN STUART, C. E., (Owensboro, Ky.,) son of James and Mary (Fairleigh) Stuart, was born in Brandenburg, Meade county, Ky., January 27th, 1855. Prepared at Owensboro Classical School, residing at Owensboro from 1868 to 1872. Entered the Institute September, 1875. Entered upon the work of his profession July, 1879, constructing streets in the city of Owensboro, which work was completed November, 1879. From that time until September, 1882, was engaged in the practice of general engineering at Owensboro, except a short period spent at Ramsey, Ill., as resident engineer on the T. C. & St. L. railroad. In September, 1882, accepted an engagement as engineer to the Southwing mining and transportation company, operating in Tuscaloosa county, Ala., where he remained until March, 1883. April, 1883. accepted a position with the Louisville bridge and iron company. June, 1883, appointed assistant to the resident engineer of the Henderson bridge company, which posi-

tion he held until December, 1883, when he was appointed private secretary to the general manager of the St. Louis, Alton & Terre Haute railroad. P. O. address, 104 North Fourth street, St. Louis, Mo.

JOHN ANDERSON BAUSH TOMPKINS, C. E., son of Gilbert H. and Phebe K. (Downing) Tompkins, was born in Brooklyn, Kings county, N. Y., January 1st, 1857. Attended the Brooklyn Polytechnic Institute, Brooklyn, N. Y., and entered the Institute in September, 1875. From July, 1879, to the fall of 1880, in Colorado, mining engineering and mineral surveying; August, 1882, to January, 1884, resident engineer V. S. & P. railroad, Louisiana. Engaged in the mercantile and manufacturing business from November, 1880, to August, 1882. Married, January 7th, 1880, Therese R. LaDu. Three children; two living; P. O. address, Wolcott, Wayne county, N. Y.

JOHN TOWNSEND, C. E., son of Theodore and Louise (Mickle) Townsend, was born in Albany, Albany county, N. Y., February 28th, 1859. Prepared at the Albany Academy, and entered the Institute in September, 1875. June, 1879, transitman in the United States engineer's office, Albany, N. Y.; May, 1880, assistant civil engineer Pennsylvania steel works, Steelton, Pa., two years; October, 1882, steel inspector Albany & Rensselaer iron and steel company; July, 1883, Johnson steel street rail company, Johnstown, Pa.; 1884, with the same company, in the position of secretary. P. O. address, Johnstown, Cambria county, Pa.

WILLIAM WALLER, JR., C. E., (Chicago, Ill.,) son of William and Ann Adelia (Johnson) Waller, was born in Lexington, Ky., September 28th, 1857, and entered the Institute in September, 1875. His father died in March, 1880, leaving a large estate, of which he has charge. Treasurer of the Peletier pavement company, of Chicago, Ill., and also one of the directors. Married, November 14th, 1882, Louise H. Hamilton, daughter of J. K. Hamilton, of Chicago, Ill. One child. P. O. address, 164 LaSalle street, Chicago, Ill.

WILLIAM GLYDE WILKINS, C. E., was born at Pittsburgh, Pa., April 16th, 1854. Prepared at Detroit public schools and grad-

uated at Detroit High School, class of 1872, entering the Institute in September of the same year. From June, 1873, to June, 1874. was with the Munising iron company, Lake Superior; June, 1874, to September, 1876, on engineering corps, Pennsylvania railroad, Pittsburgh, Pa., when he re-entered the Institute and completed his course. June, 1879, to June, 1880, on government survey of Mississippi and Missouri rivers; since then, assistant engineer of construction, Pennsylvania railroad company, engaged on location of Pennsylvania Schuylkill railroad. Had charge of construction of division 4, P. S. V. railroad; Duquesne freight station, Pittsburgh; pier at Greenwich Point, and various surveys. Married, December 29th, 1880, Sarah R. Simmons, daughter of William A. Simmons, of Troy, N. Y. P. O. address, 233 South Fourth street, Philadelphia, Pa.

FREDERIC NEWTON WILLSON, C. E., Troy, N. Y.,) son of T. Newton and Mary Caroline (Evarts) Willson, was born in Brooklyn, N. Y., December 23d, 1855. Prepared at Troy Academy, and entered the Institute in 1875, Division C. Taught in Troy Academy during academic year 1877–78; then joined and graduated with the class of 1879. Chair of mathematics, Lake Forest (Ill.) University, 1879–80; foreign correspondent of Drexel, Morgan & Co., bankers, New York city, August to November, 1880; professor of descriptive geometry, stereotomy and technical drawing in the John C. Green School of Sciences, Princeton College, N. J., January, 1881, to the present time. Junior member American Society of Civil Engineers; member of American Society of Mechanical Engineers. Married, May 22d, 1884, Mary Hewes Bruere, daughter of Joseph H. Bruere, of Princeton, N. J. One child. P. O. address, Princeton, N. J.

DON CARLOS YOUNG, C. E., son of Brigham and Emily Dow (Partrige) Young, was born in Salt Lake City, Utah territory, May 6th, 1855. Prepared with Dr. John R. Park at the University of Deseret, and entered the Institute in September, 1875. July, 1879, accepted a position on Utah Southern railroad extension, which was then being built to the Horn silver mine, Frisco, in Southern Utah. He remained there three months and then returned to Salt Lake City to attend to his private business. The following year, in June, spent three weeks at railroading on a narrow gauge road in Nephi canyon, which now belongs to the

D. & R. G. railroad company. Soon after he returned to Salt Lake City and commeneed the practice of architecture, which he adopted as a profession, and still follows; also instructor in University of Deseret. Was elected a member of the House of Representatives from the district composed of the counties of Morgan, Salt Lake and Davis, August, 1883. Member of the Rensselaer Society of Engineers, of Troy, N. Y. Married, September 22d, 1881, Alice Naomi Dowden, daughter of Edwin Dowden, formerly of London, England. One child. P. O. address, Box 654, Salt Lake City, Utah.

FERAMORZ LITTLE YOUNG, C. E., son of Brigham and Lucy (Decker) Young, was born in Salt Lake City, Utah territory, September 16th, 1858. Prepared at the University of Deseret, and was at the United States Naval Academy two and one-half years before entering the Institute in January, 1877. Spent the summer of 1879 on the Utah Southern Extension railroad and on the Salt Lake & Jordan canal. Partner in the firm of Young, Mark & Young; also partner in the firm of J. D. Swaner & Co., jewelers. Member of the Rensselaer Society of Engineers. In October, 1880, he was called upon a mission to Mexico, leaving Utah in November for that field of labor. During the greater part of the time while in Mexico he was a close student of the Bible, Book of Mormon, and Doctrine and Covenants. His health failing, he left the city of Mexico for home September 15th, and died at sea of typhoid fever on September 27th, 1881, about one hundred and ten miles from Havana. He was buried on September 28th, at 1:50 P. M., from the steamer Knickerbocker, about twenty miles from the Florida coast and a little southeast of the Jupiter lighthouse.

CLASS OF 1880.

FRANK LESLIE CLARK, C. E.. son of William and Jane (Dunn) Clark, was born in St. Louis, Mo., December 13th, 1856. Attended Pittsburgh High School, and entered the Institute February, 1877. For three years previous was engaged in learning the different branches of iron manufacture. Engaged as assistant chemist to Pittsburgh Bessemer steel company, October,

1880, and afterward served them as chemist. April, 1882, in the iron business at Forest City iron works, Cleveland, O. Member of Cleveland Engineers Society. Married, February 1st, 1881, Julia Leach, daughter of Joseph S. Leach. One child. P. O. address, Cleveland, O.

ARTHUR COBB, C. E., son of Junius B, and Alcie A. (Wilkinson) Cobb, was born in Cleveland, Cuyahoga couuty, O., September 9th, 1860. In 1863 his family removed to Chicago, Ill., and remained there until 1873, and during this time he attended the public schools of that city. In 1873 the family returned to Cleveland, and the next year visited Europe. Prepared for the Institute in Cleveland after returning from Europe, and entered in September, 1876. September, 1880, employed under the U. S. government with Mississippi river commission, near Memphis, Tenn.; was transferred to St. Louis, Mo., and promoted to rank of assistant engineer, where he remained until March, 1881, when he took a position in the engineering department of the New York, Pennsylvania & Ohio railroad company at Cleveland. P. O. address, 315 Euclid avenue, Cleveland, O.

ALBERT NEWMANN CONNETT, C. E., (South Orange, N. J.,) son of Eugene N. and Sophia (Rutau) Connett, was born in Bethel, Fairfield county, Conn., July 12th, 1859. Prepared at Riverview Military Academy, Poughkeepsie, N. Y., and entered the Institute January, 1877. Entered upon the work of his profession September, 1880, with William E. Worthen, New York city; January 25th, to July 3d, 1881, was on United States government work at St. Charles, Mo., under L. E. Cooley, C. E., for the improvement of the Missouri river at that point. July 4th to September 7, 1881, resident engineer at Cowden, Ill., for the Toledo, Cincinnati & St. Louis railroad. September 12th, 1881, to December 3d, 1881, assistant engineer Union Pacific railroad, on Oregon Short Line, at Soda Springs, Idaho. February 20th, 1882, to March 1st, 1884, assistant to William C. Worthen, C. E., at New York. He had the immediate supervision of the erection of water works at East New York, L. I., for the Long Island water supply company. Junior member of American Society of Civil Engineers. P. O. address, South Orange, N. J.

WADE CONVERSE, C. E., was born in Columbus, O., March 20th, 1856. 1885, division superintendent of the Northern Pacific railroad, stationed in Montana.

WILBERFORCE BEECHER HAMMOND, C. E., (Douglass, Mass.,) son of John C. and Lucy J. (Thayer) Hammond, was born in East Douglas, Worcester county, Mass., April 21st, 1855. Prepared at East Greenwich (R. I.) Seminary, and Westboro (Mass.) Seminary, entering the Institute in September, 1875. After the junior year, in August, 1878, worked one year as assistant engineer to Major C. R. Suter, United States engineers, at St. Louis, Mo., Atchison, Kan., Point Pleasant, Mo., Omaha and Council Bluffs. He returned to the Institute in 1879, and graduated in the class of 1880. Worked one year under same officer (Major Suter) at Brownsville, Neb.; from there to Black Hills as superintendent of the Barstow silver mining company, and afterward superintendent of Richmond silver mining company, of New York. Designed and built hoisting works on Barstow silver mining company's property. Also, with partner, I. B. Hammond, of Chicago, designed and constructed hoisting, pumping and crushing plant for Oro Fino mining company, Black Hills, together with other improvements in mill and tramway. At present civil engineer and contractor, Boston, Mass. Member of the Rensselaer Society of Engineers and American Society of Mining Engineers. Married, August 29th, 1883, Lillian C. Lane, daughter of J. C. Lane. P. O. address, Boston, Mass.

GUSTAVE KAUFMAN, C. E., son of Simon and Sybilla (Marks) Kaufman, was born in Allegheny, Allegheny county, Pa., February 14th, 1859. Prepared at Pittsburgh Central High School, graduating in June, 1876, and entered the Institute in September, 1876. From July, 1880, for about six months, draughtsman for Keystone bridge company, Pittsburgh, Pa.; April, 1881, entered the service of the Pennsylvania railroad company, in construction department ; August, 1881, in employ of Pittsburgh & Western railroad ; February, 1883, to September, 1883, on Pittsburgh Junction railroad. Since September, 1883, practicing profession at Pittsburgh, Pa. Designed and built Parker division, Pittsburgh & Western railroad; Foxburg bridge, Foxburg, Pa., across the Allegheny river, 525 feet long, with approaches ;

Pittsburgh Junction railroad, four miles long, in city of Pittsburgh, having a tunnel 3,000 feet long, double tracked and arched, through fire clay and shale; bridge iron work, 500 feet long. Member of the Rensselaer Society of Engineers and the Engineers' Society of Western Pennsylvania. P. O. address, 16 Cedar avenue, Allegheny, Pa.

WYNKOOP KIERSTED, JR., C. E., son of Wynkoop and Jane A. (Swan) Kiersted, was born at Mongaup Valley, Sullivan county, N. Y., February 9th, 1857. Entered the Institute fall of 1876. August, 1880, accepted position of assistant engineer in charge of survey, Missouri river improvement, Brownville, Neb., remaining eight months. September, 1881, assistant engineer in charge of survey, Missouri river improvement, Omaha and Council Bluffs appropriation, for one year and a half; September, 1882, associated with C. B. Davis, as assistant hydraulic engineer; in the spring of 1884, constructing engineer Fairfield (Ia.) water works, which cost about $51,000, capable of furnishing 1,000,000 gallons per diem. 1885, hydraulic engineer, Omaha, Neb. Member Rensselaer Society of Engineers. P. O. address, Omaha, Neb.

WILLIAM JOHN KING, C. E., (Chambersburg, Pa.,) son of John and Margaretta (Scott) King, was born at Pattonsville, Bedford county, Pa., January 1st, 1860. Prepared at Mercersville Academy, and in geometry by Prof. Wright, and entered the Institute September, 1876. Entered engineer's office of the Pennsylvania railroad company in October, 1880, and in October, 1881, was made assistant supervisor of division 10, Pittsburgh division. On the morning of November 22d, 1881, while running a line for a new siding near the western end of Horseshoe curve, he stepped from the uorth to the south track to avoid a westbound train, and was struck by an engine going east on south track. His death was almost instantaneous.

STRICKLAND LANDIS KNEASS, C. E., son of Strickland and Margaretta S. (Bryan) Kneass, was born in Philadelphia, Pa., January 7th, 1861. Prepared at Rugby Academy, Philadelphia, and entered the Institute September, 1876. September, 1880, entered the machine shops of William Sellers & Co., where he received a three years' course in practical machine construction.

At present in their employ in capacity of mechanical engineer. Member of Engineers Club of Philadelphia, October, 1880. P. O. address, 418 South Fifteenth street, Philadelphia, Pa.

LUIZ GANZAGA DA SILVA LEME, C. E., LL. B., son of Luiz Manuel da Silva and Carolina Eufrasia de Moraes Leme, was born in the city of Braganza, province of S. Paulo, Brazil, August 3, 1852. Prepared for the law school at S. Paulo in a seminary; entered law school in 1872, and graduated in 1876; came to the United States in January, 1877, and having studied privately the first year, entered the Institute September, 1877, in Division C. In vacation of 1878 was at the C. P. T. works, examining the furnaces, mines, &c. After his junior year, was employed with the engineers in charge of triangulation and sounding of Missouri river, at Omaha, Neb., as transitman. In 1880, in Savannah, Ga., as assistant engineer under the general manager of the S. F. & W. railroads. In October went back to Brazil, and was for five months in engineer's office. April, 1881, assistant engineer on S. Carlos railroad. April, 1883, in charge of preliminary survey party, as chief of section, to prolong the road. December, 1883, took charge of the Bragantina railroad, as chief engineer; when the road was opened, in August, 1884, he was made general manager, which position he now holds. Bachelor of Laws and member of Rensselaer Society of Engineers. Married, September 8th, 1883, Maria Fausta da Silva Macedo, daughter of Major Francisco de Assis Aranjo Macedo. One child. P. O. address, S. Paulo, Rua de S. Bento 67, Brazil, S. A.

CHARLES ROLLIN MANVILLE, C. E., (Carbondale, Pa.,) son of Rollin and Helen Macdonald (Gilbert) Manville, was born in Honesdale, Wayne county, Pa., January 13th, 1858. Attended Gilbertsville Academy and Collegiate Institute, Gilbertsville, N. Y., and was subsequently instructed by W. T. Colville, M. A. He entered the Institute in the fall of 1875. June, 1880, assistant engineer Delaware & Hudson canal company's railroad, Carbondale, Pa.; March, 1883, engineer Delaware & Hudson canal company's railroad, Carbondale, Pa. Married, June 5th, 1883, Carrie Augusta Oakes, daughter of Albion Keith Paris Oakes. Wife died February, 1886. One child. P. O. address, Carbondale, Lackawanna county, Pa.

HUGH PLUMMER MCCLINTOCK, C. E., (Pittsburgh, Pa.,) son of Hamilton and Mary E. (Jack) McClintock, was born in McClintockville, Venango county, Pa., May 29th, 1857. Prepared at Newell Institute, Pittsburgh, Pa., and entered the Institute in February, 1877, division C. From August, 1880, to the latter part of July, 1881, on Pennsylvania railroad, at Greensburg and Blairsville, Pa.; July, 1881, to July, 1882, on Pittsburgh, McKeesport, Youghiogheny railroad at McKeesport, Pa.; August, 1883, to November, 1883, James River Valley railroad, with headquarters at Jamestown, Dakota territory; administrator of his father's estate, August, 1882, at Pittsburgh, Pa. Is now engaged in the manufacture of brick at Jamestown, Dakota; firm name, Morris & McClintock. Was principal assistant engineer on James River Valley railroad while engaged on that work. P. O. address, Jamestown, Dakota.

FRANK CHITTENDEN OSBORN, C. E., (Calumet, Mich.,) son of Reuben Howard and Livonia (Chittenden) Osboru, was born in Maple Grove, Ontonagon county, Mich., December 18th, 1857. Prepared at the Calumet High School, Mich., and entered the Institute in September, 1876. He entered the service of the Louisville bridge and iron company July 25th, 1880, as assistant engineer, and was afterward principal assistant engineer; at present principal assistant engineer Keystone bridge company. Edited "Tables of Moments of Inertia and Squares of Radii of Gyration," 1886. Married, October 27th, 1880, Annie Paull, daughter of Stephen Paull. P. O. address, Pittsburgh, Pa.

JAMES WARREN PEARL, C. E., son of Warren H. and Minerva A. (Randall) Pearl, was born in Benton, Berrien county, Mich., January 25th, 1857. Prepared at Benton Harbor High School, and entered the Institute September, 1876. May to September, 1879, on United States surveys at Lake Providenee, La., and St. Joseph, Mo. July to September, 1880, Chicago, Milwaukee & St. Paul railroad, at Monroe, Wis. September to November, 1880, United States surveys at Brownville, Neb. November, 1880, to February, 1881, United States surveys at Vermillion, Dak. Ter. February to November, 1881, United States surveys and improvement of Missouri river at Omaha, Neb., and Council Bluffs, Ia. November, 1881, to September, 1882, United States surveys and improvement Missouri river at Brownville, Neb.,

and United States survey of Nishnabotua river. September, 1882, to March, 1883, United States improvement of Missouri river at Kansas City, Mo. Since May, 1884, with Berlin iron bridge company, as contracting engineer. Member of Rensselaer Society of Engineers. Married, September 20th, 1882, Minnie Bronson, daughter of Rush Bronson. Three children, born June, 1883. P. O. address, Binghamton, N. Y.

JOSEPH WILLIAM POWERS, C. E., son of Albert E. and Lucy C. (Allen) Powers, was born in Lansingburgh, Rensselaer county, N. Y., June 28th, 1858. Prepared by Edward A. H. Allen, and entered the Institute June, 1876. October 25th, 1880, was land surveyor with New York, Lackawanna & Western railroad, six months; bridge inspector, three months; bridge engineer, twenty months; village surveyor, summer of 1883; January 1st, 1884, bridge engineer of northern railroad department of Delaware & Hudson canal company. Built foot bridge over the Susquehanna river for the city of Binghamton, as engineer and contractor. March, 1883, completed the invention of a steam railroad buggy with engine and boiler of special design. Designed and built iron bridges, &c., on New York, Lackawanna & Western and Delaware & Hudson canal company's railroads. 1886, manager of Troy electric light company. Member of Rensselaer Society of Engineers. Married, November 19th, 1885, Emma J. Tibbits, daughter of William H. Tibbits, of Troy, N. Y. P. O. address, Lansingburgh, N. Y.

JULIO SAMPER, C. E., (Bogota, United States of Colombia) son of S. and R. (Pauldina) Samper, was born in Honda, United States of Colombia, S. A., August 11th, 1885. Prepared at the National University of Bogota, U. S. of C., and entered the Institute in September, 1876. When about going to Mexico on railroad work, a better opportunity for business presented itself in New York city. Several positions were also offered on railroad and public works in the United States of Colombia. His present occupation is commission merchant with the firm of S. Samper & Co. The National University, United States of Colombia, conferred upon him the degree of C. E. P. O. address, 62 Wall street, New York.

PRESTON KING YATES, C. E., son of Evert Lansing and Catherine H. (Abel) Yates, was born in Canajoharie, Montgomery county, N. Y., December 17th, 1856. Attended district school. Was one year at School of Mines, Columbia College. Entered the Institute in September, 1877. February, 1881, draughtsman for New York, Lackawanna & Western railroad at Dansville, N. Y.; May 1st, 1881, assistant engineer New York, West Shore & Buffalo railroad at Little Falls, N. Y.; December, 1881, transitman on the South Pennsylvania railroad at Uniontown, Pa.; June, 1882, senior assistant engineer in charge of location, with same company, at Waynesburg, Pa; October, 1883, locating engineer on New York, Richfield Springs & Cooperstown railroad, for two months. Member of the American Society of Civil Engineers. Married June 25th, 1884, Elizabeth Sheldon Smith, daughter of Adam Smith. P. O. address, Canajoharie, Montgomery county, N. Y.

FREDERICK STAFFORD YOUNG, C. E., son of Edmund Murray and Josepha Matilda (Macdonald) Young, was born in New York city, January 18th, 1857. Prepared at St. John's School, Sing Sing, N. Y., and entered the Institute September, 1875. Left the Institute in March, 1878, returning at beginning of the same term in 1879. Since graduation, has been interested in the Snake River mining district of Colorado, in mining and milling. 1881–84, conducted the Sisapo sampling mill for the sampling of ores. January to March, 1882, engaged in preliminary work of locating line of the Santo Domingo railroad, from Samana Bay to Santiago, Santo Domingo, West Indies. 1886, secretary of the Gilbert car company, Troy, N. Y. P. O. address. Troy, N. Y.

CLASS OF 1881.

GARNET DOUGLASS BALTIMORE, C. E., son of Peter F. and Caroline A. (Newcomb) Baltimore, was born at Troy, N. Y., April 15th, 1859. Prepared at Troy Academy, and entered the Institute June, 1877. June 17th, 1881, assistant engineer on the construction of Albany & Greenbush bridge, nine months; engineer in charge Sandy Hill railroad, two months; with Gilbert

car company, two months ; assistant engineer Hudson river improvements, six months ; engineer in charge Albany, Granville & Rutland railroad, one month ; Troy water works, one month ; engineer in charge of Shinecock & Peconic canal, Good Ground, L. I., eighteen months ; 1886, on Hudson river improvement between Troy and Catskill. P. O. address, 7 First street, Troy, N. Y.

RICHARD PARKHURST BLOSS, C. E., (Troy, N. Y.,) son of Jabez Parkhurst and Katherine (Van Schaick) Bloss, was born in Burlington, Des Moines county, Iowa, October 11th, 1859. Prepared at Troy Academy and entered the Institute in September, 1877. Entered upon the work of his profession October 10th, 1881, as mining engineer for the Manhattan silver mining company, Austin, Nev. He resigned March 1st, 1882. Engineer of construction of the Hudson river pulp and paper company, Palmer's Falls, since March 14th, 1883. Member of the American Society of Mining Engineers. Married, August 30th, 1882, Elizabeth J. Peard, daughter of William L. Peard. One child. P. O. address, Palmer's Falls, Saratoga county, N. Y.

WILLIAM HENRY BREITHAUPT, C. E., (Berlin, Ontario,) son of Louis and Catherine (Hailer) Breithaupt, was born in Buffalo, N. Y., January 25th, 1857. Prepared at High School, Berlin, Ontario, and at North Western College, Naperville, Ill., entering the Institute in September, 1877. Took a position on construction work on the New York, West Shore & Buffalo railroad August, 1881, working mainly on West Point tunnel. Private business kept him at Berlin, Ont., during 1882. Appointed bridge inspector for Pennsylvania railroad company, January, 1883, and in October, 1883, assistant engineer in the office of C. Shaler Smith, of St. Louis. In 1886, of the firm of Breithaupt & Allen, civil engineers and specialty, iron and steel structures. Member of the Rensselaer Society of Engineers. P. O. address, Kansas City, Mo.

WILLIAM BROOKS CABOT, C. E., son of Norman F. and Lucy T. (Brooks) Cabot, was born in Brattleboro, Windham county, Vt., February 2d, 1858. Attended Williston Seminary, Easthampton, Mass., Hopkins grammar school, New Haven, Conn., Sheffield scientific school, and entered the Institute 1877.

July, 1881, leveler on Union Pacific railroad, until September, 1882, chiefly on Utah & Northern railroad and Oregon Short Line. 1882, general engineer Everett iron company, Everett, Bedford county, Pa. 1886, assistant engineer Union Pacific railroad. Married, Elizabeth Parker, of Newton, Mass., June, 1886. P. O. address, Omaha, Neb.

PALMERIO DE CARRATHO CANTANHEDE, B. S., C. E., son of Raimundo Joaquin and Raimunda Francisca de (Carratho) Cantanhede, was born at Maranhao, province of Maranhao, Brazil, S. A., April 12th, 1858. When ten years of age went to Lisbon to school, remaining three years ; afterward to England, France, Denmark, etc.; then spent five years in Switzerland, at University of Geneva ; came to the United States in May, 1879, and entered the Institute in February, 1880. In July, 1881, at Council Bluffs bridge works, designing wood, combination and iron bridges ; then on Missouri river improvements ; left to go to Brazil, where, in July, 1882, he was called by the President of the province of Maranhao to take charge of construction of the Estiva road. In May, 1883, in charge, as chief engineer, of commission charged with the investigation of the navigable rivers of Maranhao ; left in May, 1884, when he was appointed to execute the work designed ; did not accept, and was afterward appointed by the Imperial Government as first assistant engineer of harbor and river improvements in the province of Maranhao ; now chief engineer *ad interim* of Maranhao harbor and river improvements. Made designs for improvement of Pindare and Itapecuru rivers ; designed the works for Estiva road ; also, bridges for Council Bluffs bridge company. Received the honorary degree of Bachelier es Sciences Mathematiques from University of Geneva. Member of Rensselaer Society of Engineers and Engineers Club of Rio de Janeiro. P. O. address, Maranhao, Brazil, S. A.

JOHN STORY CHAMBERS, JR., C. E., son of John S. and Emma M. Chambers, was born at Scranton, Mercer county, N. J., April 1st, 1848. Prepared at Trenton Academy, Trenton, N. J. Machinist by trade, and worked in several different shops. Entered the Institute in 1877. Rodman on Pennsylvania railroad, August, 1881, to April, 1882 ; inspector bridge construction and track material, Pennsylvania railroad, from August, 1882, to

September, 1884; inspector construction temporary wooden bridge, Market street, Philadelphia, September, 1884, to February, 1885. Since then inspector Pennsylvania railroad. Member of Engineers Society of Western Pennsylvania and of the Franklin Institute of Phfladelphia. P. O. address, box 217, Trenton, N. J.

TOWNSEND VAIL CHURCH, C. E., son of Charles R. and Mary E. (Vail) Church, was born in Troy, N. Y., September 7th, 1858. Prepared at the Troy Academy, under the direction of Prof. T. Newton Willson, and entered the Institute September, 1877. After he was graduated, entered upon the work of his profession, June 19th, 1881, with the Albany and Greenbush bridge company, Albany, N. Y. Was then employed with the North Chicago rolling mill company, South Chicago, Ill.; Hudson river ore and iron company, Burden, N. Y.; water department, Troy, N. Y., and is at present with R. D. Wood & Co., Philadelphia, Pa. P. O. address, Camden iron works, Camden, N. J.

FRANCISCO D'ASSIZ CINTRA, C. E., San Paulo, Brazil, S. A., was born April 16th, 1854, in Braganza, Brazil. P. O. address, Penha de Rio de Peixe, San Paulo, Brazil, S. A.

GEORGE WASHINGTON GALE FERRIS, JR., C. E., son of G. W. G. and Martha (Hyde) Ferris, was born in Galesburg, Knox county, Ill., February 14th, 1859. Moved from Galesburg, Ill., to Carson City, Nev., in 1864, and in 1873 went to Oakland, Cal., to attend the Military Academy, and graduated a first lieutenant in June, 1876. Entered the Institute in September, 1876, and after graduating in 1881 went to New York city and entered the railroad contracting office of the late General J. H. Ledlie. Remained in New York city until October, 1881, when he was sent to Charleston, W. Va., and commenced work on the location of the proposed Baltimore, Cincinnati & Western railroad up the valley of the Elk river as transitman. He worked in this capacity three months and was given charge of party on location. Remained at this work until April, 1882, when he went to Queen City, W. Va., as engineer to Queen City coal mining company. After remaining four months he was made general manager of the same, and acted in this capacity until the works closed, in the fall of 1882, when he went to Louisville

as assistant engineer of the Louisville bridge and iron company, where he was employed until August, 1883. Since then has been connected with the Henderson bridge company in various capacities. In May, 1884, went to the Union iron mills, Pittsburgh, Pa., to inspect iron and steel for the Henderson bridge superstructure. In April, 1885, entered the employ of the Kentucky & Indiana bridge company, at Louisville, Ky., to take charge of the testing and inspection of iron and steel procured in Pittsburgh, Pa., for superstructure; 1886, inspecting engineer, Pittsburgh, Pa. Located seventy-eight miles of the proposed Baltimore, Cincinnati & Western railway in West Virginia. Built a narrow gauge railroad in Putnam county, W. Va., three and one-half miles long. Designed and partially built a coal trestle in Kanawha river for Queen City coal and mining company, at their works in West Virginia. Located and drove three tunnels, each 1,800 feet long, for coal works at Queen City, W. Va. P. O. address, box 529, Pittsburgh, Pa.

JOHN JACKSON HENRY, C. E., son of F. Charlton and Mary E. (Jackson) Henry, was born in Germantown, Pa., September 28th, 1859. Prepared at Germantown Academy, and entered the Institute in September, 1877. September, 1881, joined the engineer corps of the Pennsylvania railroad engaged at Conshohockin, Montgomery county, Pa., in running the preliminary line of the Philadelphia, Norristown & Phœnixville railroad. He remained with this corps three months and then spent one month at the Pennsylvania railroad office, Philadelphia, and four months on the reconstruction of the Pennsylvania railroad, main line, between Overbrook and Downingtown. Resigned this position and became engaged in the lumber business with the firm of Bayard, Henry & Co., Philadelphia. In January, 1883, he became a member of said firm, which membership he still retains. Acting as general superintendent of mills and general manager of the Rolfe & Forrest City railroad. Married, November 3d, 1885, Clara Reeves, of Philadelphia, Pa. P. O. address, 2900 North Broad street, Philadelphia, Pa.

VIRGIL HENRY HEWES, C. E., (Sacramento, Cal.,) was born March 14th, 1858, in Folsom, Cal. Entered the Institute in the fall of 1877. Since graduation he has been engaged in mining

operations in Dakota territory. P. O. address, Deadwood, Dakota territory.

TARO ISHIGRO, C. E., (Sidquoka, Japan,) was born October 15th, 1862, at Hikone, Japan. After graduation, was employed as assistant engineer on the Pennsylvania railroad, Paoli, Pa., and on the improvement of the Arkansas river, Pine Bluff, Ark. He then returned home, and established himself as civil engineer at Tokio, where, after a short illness, he died, in June, 1885.

GEORGE ALEXANDER JUST, C. E., son of George K. and Christina (Boppel) Just, was born in New York city, September 14th, 1860. Prepared at College of the City of New York, and by P. C. Ricketts, and entered the Institute September, 1878. July 1st to November, 1881, with the Phœnix iron company, Phœnixville, Pa. November, 1881, to date, with New Jersey iron and steel company, Trenton, N. J., and 17 Burling Slip, N. Y. P. O. address, 17 Burling Slip, New York city.

ARTURO NAZARIO MENOCAL, C. E., (Guanabacoa, Cuba,) was born in Havana, Cuba, July 28th, 1858. Entered the Institute 1877. After graduation, was assistant engineer on the Albany bridge, Albany, N. Y., and then returned to Havana, Cuba.

WILLIAM SHEAR MCCORD, C. E., son of William and Margaret (Shear) McCord, was born in Peekskill, Westchester county, N. Y., October 7th, 1858. Studied with Charles E. Fowler, C. E., Poughkeepsie, N. Y., and at the Peekskill Military Academy. In the employ of Charles E. Fowler, C. E., during his construction of the Peekskill water works and general municipal work for the village of Peekskill, from 1873 to 1877. Entered the Institute in 1877. June, 1881, to May, 1884, in charge of inspection, Delaware bridge company, at shops of New Jersey iron and steel company, Trenton, N. J.; May, 1884, to October, 1885, assistant engineer of design, Union bridge company, on the erection of the Kentucky and Indiana bridge from Louisville, Ky., to New Albany, Ind.; 1886, assistant engineer Union bridge company. Member of the Rensselaer Society of Engineers. P. O. address, 18 Broadway, New York city.

ELMORE BOSTWICK MCNEILL, C. E., son of Edwin and Emilie A. (Dotterer) McNeill, was born in Kingston, Luzerne county, Pa., September 4th, 1860. Lived in Litchfield from 1865 until he entered the Institute. Attended Litchfield Academy until thirteen years of age, and then took private lessons from Mr. Webster, Rev. Mr. McLaughlin and Mons. Laslier. Entered the Institute in September, 1877. About July 1st, 1881, started on the New York, West Shore & Buffalo railroad as rodman; in September was made assistant engineer, in charge of section from West Point to Cornwall-on-Hudson, and in the following June resigned. Since then he has done some work on water works, railroads and mining, but has not followed engineering as a profession. Followed farming for one year. For the last year he has been studying the mechanical part of railroading at the shops at Raton, New Mexico. P. O. address, Raton, New Mexico.

THOMAS HOBBS RAINSFORD, C. E., (Trenton, S. C.,) son of John and Sallie (Hobbs) Rainsford, was born in Edgefield county, South Carolina, January 21st, 1861. Attended Washington and Lee University, Virginia, and entered the Institute in September, 1877. Engaged in farming since 1881. Member of the Rensselaer Society of Engineers. P. O. address, Trenton, S. C.

COMMODORE PERRY RUPLE, C. E., son of F. S. and S. E. (Parkhurst) Ruple, was born at Cleveland, Cuyahoga county, Ohio, March 13th, 1860. Prepared at public schools of Cleveland, graduated at Cleveland High School, and entered the Institute September, 1877. Began practice June 24th, 1881, at Plattsmouth, Neb., as United States assistant engineer on Missouri river improvements; December 1st, 1881, transferred to Lake Providence Reach, Mississippi river improvement, where he still remains. His work has been in the construction department, the work of building pile dykes being in his charge. P. O. address, Wilson's Point, East Carroll Parish, La.

HENRY WARD VERNER, C. E., son of James Dawson and Nancy M. (Ward) Verner, was born in Pittsburgh, Allegheny county, Pa., January 10th, 1855. After passing through the ward schools of Pittsburgh he spent one year at the high school and

one year at a private school. May, 1873, to June, 1877, in the marble business. Entered the Institute in September, 1877. Commenced work for the Pennsylvania railroad company June 20th, 1881, at Connellsville, Pa., with a corps of engineers, working on construction. After eight months he was engaged by J. W. Walker, engineer and contractor for bridges and buildings, Pittsburgh, Pa., by whom he is now employed. Married, October 7th, 1886, Florence Norton, of Gallipolis, O. P. O. address, 47th Street & A. V. railroad, Pittsburgh, Pa.

THOMAS DELANO WHISTLER, C. E., (Baltimore, Md.,) son of George W. and Julia (Winans) Whistler, was born in St. Petersburgh, Russia, January 19th, 1857. Studied in England and Germany. He lived in Europe until 1871, when he came to America and attended school in Baltimore. Worked in machine shop in Baltimore, and afterward in Boston & Albany railroad shops in Springfield, Mass. Entered the Institute in November, 1877. September, 1881, assistant engineer to Mr. Worthen until June, 1882. From this time until August, 1883, was in Europe; then returned and resumed his former position under Wm. E. Worthen, New York city. Designed and built hydraulic elevators for the Manhattan gas company, New York, for the purpose of raising their coal cars. Repaired draw of Third avenue bridge, New York city. In 1885, assistant engineer new aqueduct commission, Tarrytown, N. Y. Resigned September, 1886. Senior member of the American Society of Civil Engineers. Married, September 20th, 1881, Sophie Ames, daughter of Joseph Ames, artist. Two children. P. O. address, Tarrytown, N. Y.

CLASS OF 1882.

ERNESTO JOAQUIN BALBIN, A. B., C. E., son of J. F. and C. (Marquez) Balbin, was born at Habana, Cuba, October 22d, 1861. Prepared at Maryland Agricultural College, and by Prof. W. W. Morrill. Entered the Institute September, 1878. June, 1882, to July, 1883, bridge building at Hal, Belgium. July to December, 1883, in Cuba and the U. S. A. as contractor. December, 1883, to date, in the U. S. A. and the U. S. of Colombia, as as-

sistant to Francisco J. Cisnero, railway contractor and manager. Received degree of A. B. from Havana University. P. O. address, care Cisnero & Co., Barranquilla, U. S. of Colombia.

GEORGE RICHMOND BAUCUS, C. E., son of John S. and Ruth P. (Richmond) Baucus, was born in Hoosick, Rensselaer county, N. Y., July 6th, 1861. Prepared at Greylock Institute, South Williamstown, Mass., and entered the Institute September, 1878. Assistant in geodesy at the Institute winter session 1882; assistant in mechanics at the Institute summer session 1883; at present agent of the Durham House drainage company, Kansas City, Mo. P. O. address, Kansas City, Mo.

MCCOSKRY BUTT, C. E., son of Robert McCoskry and Frances (Morris) Butt, was born in New York city, April 18th, 1858. Prepared at College Chaptal, Paris, and Polytechnic, Hannover, entering the Institute February, 1879. Member of the stock exchange and stock broker, New York city. Married, January 9th, 1884, Minnie Havemeyer Elder, daughter of J. Lawrence Elder, of New York city. One child. P. O. address, Calumet Club, 3 West Thirtieth street, New York city.

JAMES HENRY COVODE, C. E., son of John and M. H. (Peale) Covode, was born near Lockport, Westmoreland county, Pa., October 18th, 1858. Attended Pennsylvania Military Academy, Chester, Pa.; afterward with Prof. Worrall, West Chester, Pa., entering the Institute September, 1877. Entered the service of the Pennsylvania railroad company June, 1883, and was employed at different places on the line of this road in New Jersey until September, 1883, when he went to Baltimore, Md., remaining until December, 1883. February, 1884, assistant engineer on the same road, stationed at Altoona, Pa., and in 1886 on the Pittsburgh division. Was in charge of construction of one of the branches of the West Jersey railroad. P. O. address, Pittsburgh, Pa.

ALVIN ELMER DEAL, C. E., son of John M. and Susan S. (Partridge) Deal, was born on Green Island, Albany county, N. Y., December 24th, 1860. Prepared at Troy Academy, and entered the Institute in 1878. Entered upon the work of his profession September 1st, 1883, at the Shiffler bridge works, Pittsburgh,

Pa. Member of the Engineers' Society of Western Pennsylvania. P. O. address, Green Island, N. Y.

ELVIN ANSON DEAL, C. E., son of John M. and Susan S. (Partridge) Deal, was born on Green Island, Albany county, N. Y., December 24th, 1860. Prepared at Troy Academy, and entered the Institute in September, 1878. Entered upon the work of his profession November 5th, 1883, with the Keystone bridge company, Pittsburgh, Pa. Member of the Engineers' Society of Western Pennsylvania. P. O. address, Green Island, N. Y.

EDWIN FORD, C. E., son of Daniel W. and Marietta (Billings) Ford, was born in Troy, Rensselaer county, N. Y., February 22d, 1861. Prepared at Troy Academy, and entered the Institute in September, 1879. September 1st, 1882, in service of Franklin iron works, Oneida county, N. Y., four months; February 1st, 1883, with E. Prentice Treadwell, architect, Boston, Mass. Member of the American Institute of Mining Engineers. P. O. address, 5 Somerset street, Boston, Mass.

INDEPENDENCE GROVE, C. E., was born July 4th, 1855, in Peoria, Ill. Entered the Institute in September, 1878. Has been employed at the Youngstown steel works. P. O. address, Youngstown, O.

LOUIS WARREN GURLEY, C. E., son of William and Maria (Kenney) Gurley, was born in Troy, N. Y., September 16th, 1858. Prepared in Troy schools and entered the Institute May, 1880. Engaged in the manufacture of civil engineers' and surveyors' instruments, June 19th, 1882. Honorary member of association of Civil Engineers and Surveyors of Connecticut. P. O. address, Troy, N. Y.

STEPHEN THURSTON HAYT, JR., C. E., son of S. T. and Margaret C. (Townsend) Hayt, was born in Corning, Steuben county, N. Y., November 2d, 1859. Prepared at Corning Free Academy, and entered the Institute September, 1878. July, 1882, on line between Blossburg and Tioga, Pa.; September, 1882, on location and construction of railroad between Elkland and Westfield, Pa., which work was completed December, 1882; February, 1883, on location of line between Jersey Shore and Lock Haven, the road known now as Beech Creek, Clearfield & South-

western railroad; June, 1883, on preliminary lines between Harrison Valley and Willsville, N. Y.; this work was finished September, 1883; from September to November, 1883, on Cowanesque Valley extension; November 1st, 1883, to January 1st, 1884, on location of line from Cowanesque Valley to Middleburg, Tioga county, Pa.; was employed on these surveys as transitman, leveler, &c.; on construction as assistant or resident engineer under a division engineer; employed in each case by Fall Brook coal company; 1886, assistant mining engineer of the New York, Lake Erie & Western railroad. P. O. address, Arnot, Pa.

CONWAY BETHUNE HUNT, C. E., son of Henry J. and Mary B. (Craig) Hunt, was born in Washington, D. C., September 30th, 1861. Prepared at Emerson Institute, Washington, D. C.; four years were spent in Washington, Eastport, Me., and Newport, R. I. Entered the Institute June, 1879. Entered the service of the Pennsylvania railroad company July 5th, 1882, located at Altoona, remaining until August 1st; Greensburg, August 1st to 21st; Pittsburgh, August 22d. Employed during the summer of 1881, before graduation, on construction of the Hempfield branch of the Baltimore & Ohio railroad, at Washington, Pa. Member of Engineers' Society of Western Pennsylvania. P. O. address, Soldiers' Home, Washington, D. C.

LEWIS LEFFERTS JENKINS, C. E., son of James Edward and Cornelia (Lefferts) Jenkins, was born in Brooklyn, Kings county, N. Y., March 20th, 1860. Prepared at Adelphi Academy, Prof. Peckham, and entered the Institute in September, 1878. February, 1883, engaged in freight brokerage, New York city. P. O. address, 110 Cambridge place, Brooklyn, N. Y.

LOUIS ELLSWORTH LAFLIN, C. E., (Chicago, Ill.,) son of George Hinman and Mary M. (Brewster) Laflin, was born in Pittsfield, Berkshire county, Mass., March 23d, 1861. Prepared at Allen Academy, Chicago, and entered the Institute in September, 1878. September 18th, 1882, entered the engineer's office of the Chicago & Northwestern railway company. Was made assistant engineer May 1st, 1883. In 1886, manufacturer of letter sheet envelopes at 290 Broadway, New York city. Married, October 22d, 1885, to Josephine Knowland, daughter of Frederick Knowland, of Plainfield, N. J. P. O. address, Plainfield, N. J.

OTTO JULIUS MARSTRAND, C. E., (Copenhagen, Denmark,) son of Otto and Anny M. (Nissen) Marstrand, was born in St. Thomas, W. I., Denmark, May 8th, 1857. Prepared in Polytechnic Institute of Copenhagen, Denmark, and entered the Institute in October, 1881. Entered the service of the Louisville bridge company, October 7th, 1882, remaining three months; with the Morse bridge company, Youngstown, O., seven months; assistant engineer with the Baltimore & Ohio railroad, January 1st, 1884; 1885, instructor in civil engineering in Lehigh University, Bethlehem, Pa. Member of the Rensselaer Society of Engineers. P. O. address, Bethlehem, Pa.

JOSE DOMINGO MASSES, C. E., was born in Matanzas, Cuba, March 19th, 1859. Entered the Institute in September, 1878. Is practicing his profession of civil engineer. P. O. address, Remedios, Cuba, W. I.

THOMAS EARP NEWBOLD, C. E., (Bordentown, N. J.,) son of William A. and Louisa B. (Fobes) Newbold, was born in Brookdale, Chesterfield township, Burlington county, N. J., August 31st, 1857. Prepared at Lawrenceville Classical and Commercial High School, Lawrenceville, N. J., and entered the Institute September, 1878. October 20th, 1882, with Grand Tower iron and coal company, Grand Tower, Ill., for nine months; December 18th, 1883, civil engineer, Lansingburgh, N. Y.; 1884, civil engineer, Bordentown, N. J. Married, October 1st, 1885, Clementine Gould, daughter of the Hon. George Gould, of Troy, N. Y. P. O. address, Bordentown, N. J.

FRIEDRICH ROSENBERG, C. E., son of Friedrich Wilhelm Peter and Louisa (Freise) Rosenberg, was born in New York city, February 20th, 1858. Prepared at Freemount Seminary, Norristown, Pa.; served three years' apprenticeship as a metal worker, and entered the Institute May, 1879. Commenced practice of his profession June 26th, 1882; served six months as assistant engineer on the revision of the Western Pennsylvania railroad; from March 24th, 1883, to March 1st, 1884, assistant supervisor at Spence Creek, Pennsylvania railroad; 1885, assistant supervisor of the Delaware extension of the Pennsylvania railroad. Member of the Philadelphia Society of Engineers. P. O. address, No. 3,202 Arch street, West Philadelphia, Pa.

CHARLES SIDNEY WESTON, C. E., (Scranton, Pa.,) son of Edward W. and Susan S. (Moore) Weston, was born in Carbondale, Luzerne county, Pa., August 25th, 1860. Since 1861 has resided in Scranton, Pa. Took preparatory course at Granville Military Academy, North Granville, N. Y., and entered the Institute September, 1878. Since November 1st, 1882, has held the position of engineer, real estate department, Delaware & Hudson canal company, with headquarters at Scranton, Pa.; summer of 1881, for three months, was assistant engineer on construction of second track A. & S. division, D. & H. railroad. Designed reservoir dam and retaining walls for Providence gas and water company, Scranton. Pa. P. O. address, 2115 North Main avenue, Scranton, Pa.

CLASS OF 1883.

FRANKLIN HAYLANDER BOWEN, JR., C. E., son of F. H. and Susan B. (Wildes) Bowen, was born in Philadelphia, Pa., March 20th, 1862. Prepared under Col. H. C. Symonds, at Sing Sing, N. Y., and entered the Institute September, 1879. Since June 26th, 1883, assistant engineer of Philadelphia & Reading railroad. P. O. address, Chestnut Hill, Philadelphia, Pa.

THURBER ARNOLD BROWN, C. E., son of William H. and Letitia T. (Pattengill) Brown, was born in Corning, Steuben county, N. Y., April 6th, 1861. Prepared at Corning Free Academy, and entered the Institute in September, 1879. Entered draughting office of B. W. Payne & Sons, Corning, N. Y., June 23d, 1883, remaining two months; September 14th, 1883, entered the service of the Louisville bridge and iron company; 1885, manufacturer and dealer in tobacco. P. O. address, Corning, N. Y.

ALBERT WELLS BUELL, C. E., son of Hambden and Emma Louise (Wells) Buell, was born at Keokuk, Lee county, Iowa, November 20th, 1861. Prepared at Peekskill Military Academy, Peekskill, N. Y., and at Racine College, Racine, Wis. Entered the Institute in September, 1879. With American ship building company, Philadelphia, Pa., from July, 1883, one year; first assistant on survey for examination of condition, Des Moines

rapids canal, Mississippi river, and location of dry docks; first assistant on survey for examination of excavated channel for obstructions, Des Moines rapids, Mississippi river; first assistant to United States assistant engineer in charge of United States improvement, Mississippi river, at Canton, Mo.; inspector in local charge of United States improvement, Mississippi river, at Louisiana, Mo., under Mississippi river commission; assistant engineer and draughtsman on St. Louis, Keokuk & Northwestern and Chicago, Burlington & Kansas City railroads (C. B. & Q. system); assistant engineer Keystone bridge company. P. O. address, Pittsburgh, Pa.

CHARLES HENRY DAVIS, C. E., son of Thomas R. and Helen S. (Jarvis) Davis, was born in Philadelphia, Pa., January 20th, 1861. Attended the Ury House School, the Rugby Academy, and entered the Institute in September, 1879. August, 1883, assistant engineer with General E. W. Scovill, New York railroad survey in New York and Vermont; with Cofrode & Saylor bridge works, Philadelphia, six months; with C. B. Davis, C. E. Chicago, seven months. Since September, 1885, with James B. Diver & Co., Keokuk, Iowa, of which firm he is a partner, engaged in building highway bridges and architectural designing. Also of the firm of Wilkinson & Davis, opticians. P. O. address, Keokuk, Iowa.

GUY HARTWELL ELMORE, C. E., (Albany, N. Y.,) son of William O. and Emily A. (Gilman) Elmore, was born in North Bergen, Greene county, N. Y., October 2d, 1861. Moved to Mattawan, Mich., in 1864, and in 1875 to Albany. Prepared at Albany High School, and entered the Institute in September, 1879. September, 1883, appointed assistant in rational and technical mechanics at the Institute, Troy, N. Y.; 1884, agent of the Durham house drainage company. Member of the Rensselaer Society of Engineers. P. O. address, Kansas City, Mo.

EDWARD COURTLAND GALE, C. E., son of E. Thompson and Caroline (DeForest) Gale, was born in Troy, Rensselaer county, N. Y., October 28th, 1861. Prepared at St. John's school, Sing Sing, and entered the Institute in September, 1879. Engaged as manufacturer, South Shaftsbury, Vt. P. O. address, Troy, N. Y.

JAMES COTTLE HALLSTED, JR., C. E., son of James C. and Margaret A. (Bunn) Hallsted, was born in Waterloo, Seneca county, November 22d, 1859. Prepared at Waterloo Union School, and entered the Institute in September, 1879. September 14th, 1883, assistant engineer Louisville bridge and iron company; 1885, inspecting engineer Union iron mills. P. O. address, Thirty-third street, Pittsburgh, Pa.

EDGAR BOYD KAY, C. E., (Bellwood, Pa.,) son of I. F. and Catherine (Bell) Kay, was born at Warriors Mark, Huntingdon county, Pa., January 15th, 1860. At Logan Academy, Bellwood, Pa., 1872–74; Mountain Seminary, Birmingham, Pa., 1874–77. Home at Warriors Mark, 1860–68, and at Bellwood since that date. Engineers corps of the B G. railroad, 1878–79, and in the lumber business until entering the Institute, in September, 1880. July 10th, 1883, assistant engineer Pennsylvania railroad; at Hackensack draw bridge, Meadows, N. J., until September 10th, 1883, and then returned to the Institute as assistant in descriptive geometry, stereotomy and drawing; 1885, agent of the Durham house drainage company, Kansas City, Mo. Member of the American Institute of Mining Engineers. P. O. address, Kansas City, Mo.

JASON EVANS LIPPINCOTT, C. E., (Cincinnati, O.,) son of William J. and Sarah (Evans) Lippincott, was born in Pittsburgh, Allegheny county, Pa., January 17th, 1861. Attended the public schools of Cincinnati for nine years, then spent two years in scientific department of Swarthmore College, entering the Institute September, 1880. Entered the employ of the Kentucky Central railroad, as assistant engineer, October 17th, 1883, remaining until January 12th, 1884; since that date with Swifts iron and steel company, office Cincinnati rolling mill and blast furnace, Newport, Ky. Member of Rensselaer Society of Engineers and Ohio Mechanics' Institute. P. O. address, 26 West Third street, Cincinnati, O.

CHARLES SUMNER PRATT, C. E., son of John L. and Mary A. (Bowen) Pratt, was born at Buskirk's Bridge, Rensselaer county, N. Y., January 30th, 1863. In 1866 family removed to Kent county, Del., afterwards returning to Buskirk's Bridge. Prepared by Mrs. S. S. Perry, of Buskirk's, and entered the Insti-

tute September, 1879. Entered the service of the Burlington & Missouri river railroad, August, 1882, Lincoln, Neb., remaining until the time of his death, which occurred in January, 1885. He graduated in high standing, and was just starting out in life with brilliant prospects before him. He was assistant librarian of the Institute during the last year of his course. Delegations from the various classes in the Institute attended his funeral at Buskirk's Bridge, January 20th, 1885. Member of the Rensselaer Society of Engineers.

ROBERT JAMES PRATT, C. E., (Greenbush Heights, N. Y.,) son of James Hyde and Sophie H. (Boyd) Pratt, was born in New York city, October 28th, 1860. Prepared at Albany Boys' Academy, and entered the Institute September, 1879. Studied electrical engineering at Johns Hopkins University, 1883–84. 1885, electrician and manager of Electric manufacturing company, Troy, N. Y. Member of Rensselaer Society of Engineers. Married, October 28th, 1885, Sarah H. Easter, of Baltimore, Md. One child. P. O. address, box 123, Albany, N. Y.

ALFRED HOWARD RENSHAW, C. E., (Baltimore, Md.,) son of William and Emma (Conine) Renshaw, was born in Aspinwall House, Staten Island, N. Y., November 24th, 1861. Prepared at Virginia Military Institute, Lexington, Va., and entered the Institute in November, 1879. Entered the Albany & Rensselaer iron and steel company's Bessemer works, March 10th, 1884; December 1st, 1884, to August 6th, 1886, assistant engineer, New York aqueduct commission, Tarrytown, N. Y. Married, October 21st, 1885, Lucy J. Price, daughter of Commodore Cicero Price, of Troy, N. Y. P. O. address, Troy, N. Y.

ARTHUR HOVEY STORRS, C. E., (Scranton, Pa.,) son of William R. and Harriet (Whiton) Storrs, was born in Buffalo, Erie county, N. Y., October 12th, 1862. Removed from Buffalo, N. Y., to Scranton, Pa., in the fall of 1866. Prepared at Williston Seminary, Easthampton, Mass., and entered the Institute in 1879. July, 1883, assistant engineer coal department D. L. & W. railroad company, Scranton, Pa. Married, June 2d, 1886, Jennie Scranton Fuller, of Scranton, Pa. P. O. address, 410 Wyoming avenue, Scranton, Pa.

HENRY VIER, C. E., son of George and Sarah (Clark) Vier, was born in Troy, Rensselaer county, N. Y., September 5th, 1863. Prepared at St. Paul's Parish School, Troy, N. Y.; also with Prof. W. W. Morrill, and entered the Institute in September, 1879. July, 1883, on the Albany, Granville & Rutland railroad; August, 25th, 1883, on the New York State Adirondack survey; November 7th, 1883, and to date at United States Watervliet arsenal as draughtsman. P. O. address, 53 Federal street, Troy, N. Y.

JOSEPH AGUR WELLS, C. E., (Troy, N. Y.,) son of George A. and Hester E. (Judson) Wells, was born in Albany, Albany county, N. Y., June 22d, 1860. Prepared at the Troy Academy, and entered the Institute in September, 1879. Has traveled extensively in Europe. P. O. address, 171 Second street, Troy, N. Y.

JOHN FRANCIS WILLIAMS, C. E., B. S., son of John Martin and Frances A. (Schriver) Williams, was born in Salem, Washington county, N. Y., October 25th, 1862. Prepared at St. Paul's school, Concord, N. H., 1874 to 1880, and entered the Institute September, 1880. Special assistant in the Institute September, 1883–85, and also pursued an advanced course of study, receiving the degree of Bachelor of Science, 1885. Made a survey of Evergreen Cemetery, Salem, N. Y., 1882; assistant engineer of Albany, Granville & Rutland railroad, August, 1883. In the summer of 1884 traveled in the north of Europe, visiting the North Cape, mines and metallurgical works of Norway and Sweden; was matriculated at the Georgia Augusta University, Göttingen, Germany, fall semester of 1884, where he still remains as student. Has made careful study of volcanic phenomena of Italy and Sicily, and special investigation of the formations of Mount Amiata, in Tuscany. Member of American Association for the Advancement of Science, of the American Institute of Mining Engineers, of the Norske Turistforenings, Christiania, Norway, and of the German Chemical Society, Berlin, Germany. P. O. address, 3 Ritterplan, Göttingen, Germany.

CLASS OF 1884.

JOHN THOMPSON ARNOLD, C. E., (Cheyenne, Wy. T.,) was born in Cleveland, O., November 18th, 1850. Graduated at the United States Naval Academy, and made several cruises before entering the Institute in 1882. After graduation at the Institute he took a special course at the Stevens Institute in mechanical engineering. At present student in Paris, France. P. O. address, Cheyenne, Wy. T.

WILLIAM ANDERSON AYCRIGG, C. E., son of Benjamin B. and Catharine E. (Anderson) Aycrigg, was born at Passaic, Passaic county, N. J., April 26th, 1859. Was prepared in 1876 for a classical course at Princeton College, at D. S. Everson's Collegiate Institute, New York city, but did not enter Princeton on account of ill-health. Worked as a machinist 1878–79, and at other times since, in the Passaic Novelty Works. Entered the Institute September, 1880. Since graduation has been employed as assistant to city engineer, Omaha, Neb., and is at present assistant engineer on the Utah & Northern railroad, in charge of an extensive topographical survey, comprising portions of southwestern Idaho and western Montana. P. O. address, Ogden, Utah.

FRANCIS HENRY BAINBRIDGE, C. E., son of Robert and Martha (Smith) Bainbridge, was born in Troy, Rensselaer county, N. Y. Graduated from Troy High School in class of '80, and entered the Institute in the fall of 1881. Assistant engineer with Buck & McNulty, consulting engineers, New York city, 1885, and since assistant engineer with the Edgemoor iron works. P. O. address, Wilmington, Del.

JOHN JACOB CHISLETT, C. E., son of John and D. J. (Buell) Chislett, was born at Pittsburgh, Allegheny county, Pa., September 20th, 1860. Attended Western University of Pennsylvania during three years previous to entering the Institute, September, 20th, 1880. Was employed as clerk in Pennsylvania railroad office at Pittsburgh, Pa., and at present as assistant supervisor of the Tyrone division of Pennsylvania railroad. P. O. address, Phillipsburgh, Pa.

FRANK CHRYSLER, C. E., son of James P. and Mary J. (Hallenbeck) Chrysler, was born in Kinderhook, Columbia county, N. Y., July 17th, 1859. Prepared by Prof. William A. Reed, Kinderhook, and entered the Institute in September, 1880. Assistant engineer on the new Croton aqueduct, Yonkers, N. Y., 1884. Resigned October, 1886, to engage in manufacturing. P. O. address, Kinderhook, N. Y.

DORLON CLARK, C. E., son of Edward H. G. and Mary (Dorlon) Clark, was born in Troy, Rensselaer county, N. Y., December 12th, 1863. Prepared at the Troy Academy, and entered the Institute September 16th, 1880. In 1885, engaged at the works of the Troy steel and iron company. P. O. address, Troy, N. Y.

JOHN DESMOND COLBY, C. E., son of John Howe and Ellen (Desmond) Colby, was born in Troy, Rensselaer county, N. Y., August 3d, 1864. Prepared in the public schools of Troy, and entered the Institute in September 16th, 1880. In 1884, engaged on the new Croton aqueduct as assistant engineer, and since as civil engineer in Troy, N. Y. P. O. address, Troy, N. Y.

CHARLES WINTHROP CROCKETT, A. B., C. E. *See Assistant Professors, page 165.*

WILLIAM WARREN CUMMINGS, C. E., son of James Otis and Susan A. (Bennett) Cummings, was born at Woburn, Middlesex county, Mass., September 13th, 1864. Prepared at Woburn High School, and entered the Institute February 4th, 1881. Member of the Rensselaer Society of Engineers. Assistant in rational and technical mechanics in the Institute since September, 1884. P. O. address, 26 State street, Lansingburgh, N. Y.

SEYMOUR CUNNINGHAM, C. E., son of William Orr and Jane (Knickerbacker) Cunningham, was born at Troy, N. Y., September 13th, 1863. Prepared at Troy Academy, and entered the Institute September, 1880. September, 1884–85, with William Brough, oil operator, Franklin, Pa., and 1885 of same firm, engaged in real estate business in Washington, D. C. P. O. address, Washington, D. C.

JAMES GREEN DURBIN, C. E., son of Joseph and Louisa (Hewlett) Durbin, was born in Shirowy, Wales, G. B., September

25th, 1856. Prepared at State Normal School, Millersville, Pa., and entered the Institute September, 1880. Civil engineer, Coal Creek, W. Va. P. O. address, Coal Creek, W. Va.

JUAN FRANCISCO ECHEVERRIA, C. E., son of Don Francisco and Senora Juanita (Aguilar) Echeverria, was born April 15th, 1861, at San Jose, Costa Rica. Studied at St. Leonard's School, Hastings, England, and at Brighton College, Brighton, England, from 1876 to 1880. Joined the Costa Rican army as lieutenant, 1880, and entered the Institute in September, 1880. After graduation he returned home and engaged in commercial business. Member of Congress from city of San Jose, 1886. P. O. address, San Jose, Costa Rica.

GEORGE REUBEN ELDER, C. E., was born January 11, 1862, at Johnstown, Penn., where he has, since graduation, been employed in the iron and steel works. P. O. address, Johnstown, Pa.

FRANK CLOPPER HUTTON, C. E., (The Woodlands, Md.,) was born in Baltimore, Md., April 18th, 1862. P. O. address, The Woodlands, Md.

EDWARD WARREN KILBOURNE, C. E., son of Levi H. and Louisa Maria (Sloane) Kilbourne, was born in Sandusky, O., May 22d, 1852. His father came to New York city in 1859, where the family resided until 1873. Studied in the schools of New York city ; also took courses in drawing and modeling at Cooper Institute ; also studied surveying, and was engaged for a time on one of the preliminary surveys of the New York, West Shore & Chicago railroad under General Charles B. Stuart. Was appointed agent for the American express company, at Alton, Ill., and afterward at Greencastle, Ind. Entered the Institute in advanced standing September 15th, 1882. After graduation was employed as instructor in the Troy Academy. P. O. address, Troy, N. Y.

SAMUEL PEASE MCKINNEY, C. E., son of Samuel C. and Mary A. (Earl) McKinney, was born at Troy, N. Y., October 12th, 1861. Prepared at Troy High School and Troy Academy, and entered the Institute September, 1880. Assistant engineer Burlington & Missouri railroad, in Denver, Col., and since in Ne-

braska. Member of Rensselaer Society of Engineers. P. O. address, La Crosse, Wis.

MARSHALL G. MOORE, C. E., son of Austin and Kate T. (Mattison) Moore, was born at Washington, Warren county, N. J., October 19th, 1859. Prepared at the "School of the Lackawanna," Scranton, Pa. Residence, Scranton; occupation, surveyor. Entered the Institute September, 1880. July 1st, 1884, in the service of the Lackawanna iron and coal company, as assistant surveyor; 1885, assistant engineer in charge of railroads, Cambria iron works. P. O. address, Johnstown, Pa.

EDWARD LYNNE PAINTER, C. E., son of Milton and Sarah (Hickson) Painter, was born in Baltimore county, Md., February 27th, 1863. Prepared at Baltimore City College, and entered the Institute February, 1882. P. O. address, Owings Mills, Baltimore county, Md.

CHARLES WELLMAN PARKS, C. E., son of Granville and Elizabeth Augusta (Carter) Parks, was born at Woburn, Middlesex county, Mass., March 22d, 1863. Graduated from Woburn High School, and entered the Institute September, 1879. September, 1881, assistant on Missouri river survey, at Omaha, Neb., ten weeks; December, 1881, assistant on survey for Arkansas narrow guage railroad, from Van Buren, Ark., to Joplin, Mo., fifteen weeks; April, 1884, engineer in charge of surveys for Denver, Memphis & Atlantic railroad, seventeen weeks; September, 1884, topographer Burlington & Missouri River railroad, in Nebraska. 1885, assistant in geodesy in the Institute; 1886, appointed professor *pro tem.* of physics in the Institute. Member Rensselaer Society of Engineers. P. O. address, Troy, N. Y.

MANUEL PERCY QUINTANA, C. E., was born in Santander, Spain, March 19th, 1864. Prepared for the Institute in this country, and entered in the fall of 1880. Assistant engineer water works, Little Falls, N. Y. P. O. address, Little Falls, N. Y.

GEORGE LAWRENCE REMENTER, C. E., A. M., son of Lewis and Catharine (Young) Rementer, was born at Philadelphia, Pa., February 19th, 1861. Graduated from Boys' Central High

School, of Philadelphia, February 16th, 1881, and entered the Institute February 3d, 1881. P. O. address, Philadelphia, Pa.

HENRY MARTYN ROOD, A. B., C. E., was born in Natal, South Africa, March 8th, 1855. Graduated from Yale College in 1877, and entered the Institute, in advanced standing, in the fall of 1881. Fall of 1884, assistant engineer Suburban transit company, New York city. P. O. address, 76 Wall street, New York city.

FRANCIS SPEARMAN, C. E., (Sharon, Pa.,) son of John J. and Cordelia (Breed) Spearman, was born at Sharpsville, Mercer county, Pa., November 18th, 1862. Prepared at Greylock Institute, South Williamstown, Mass., 1879–80, and entered the Institute September, 1880. After graduation, took the superintendence of an iron furnace at Steubenville, O. Married, November 26th, 1885, to Jennie Tribby, of Sharon, Pa. P. O. address, Steubenville, O.

HARRY LEE VAN ZILE, C. E., son of Oscar E. and Sarah M. (Perry) Van Zile, was born in Troy, N. Y., September 20th, 1864. Prepared at the Troy Academy, and entered the Institute 1880. 1884–85, assistant in geodesy in the Institute; August 1st, 1885, entered the firm of Van Zile, MacCormack & Co., as junior partner and engineer. P. O. address, 55 North Pearl street, Albany, N. Y.

PAUL VOORHEES, C. E., (Ballston, N. Y.,) son of B. F. and Margaret (Sinclair) Voorhees, was born at San Francisco, Cal., March 14th, 1859. Was two years at Philips Exeter Academy, Exeter, N. H., and entered the Institute September, 1880. Assistant engineer Delaware & Hudson canal company. P. O. address, Yonkers, N. Y.

HOWARD MITCHELL WILSON, C. E., son of Samuel and Eliza (Mitchell) Wilson, was born in Pittsburgh, Allegheny county, Pa., October 22d, 1861. Prepared at Pittsburgh High School, and entered the Institute September, 1880. P. O. address, Craig street, Pittsburgh, Pa.

MONTGOMERY WADDELL, C. E., (Cobourg, Canada,) son of Robert Needham and Angeline E. (Jones) Waddell, was born at

Port Hope, Durham county, province of Ontario, Canada, May 1st, 1862. From 1865 to 1877 was a resident of Cobourg, Canada; spent three years previous to the summer of 1877, attending Cobourg Collegiate Institute; spring of 1878 in Toronto; 1878–79, at McGill College, Montreal, applied science course; fall of 1879 in Manitoba. Entered the Institute spring of 1880, and continued until end of sophomore year, 1881; fall of 1881, went to Council Bluffs, Ia., and was on Missouri river improvements until December, when he went as transitman with a railroad party surveying preliminary line from Van Buren, Ark., to Joplin, Mo. Returned to the Institute in the fall of 1882. 1885 at the Edison electric works. P. O. address, 104 Goerck street, New York city.

CHARLES WIDNEY WOOD, C. E., (New Orleans, La.,) son of Burris Dudley and Miriam Anne (Widney) Wood, was born in Chartiers township, Allegheny county, Pa., November 4th, 1863. Removed from his birthplace to New Orleans, La., in 1865, returning to Pittsburgh in 1873, there finishing grammar school and entering high school; returned to New Orleans in 1877. He took a four years' course at the Louisiana State University, Baton Rouge, La., principally scientific, 1877–81. Entered the Institute November 3d, 1881. In 1886, manager of the Birmingham bridge company, of which F. C. Osborne, C. E., of '80, is consulting engineer. Married, October 14th, 1886, Ida Evelyn Pettiss, daughter of P. W. Pettiss, of New Orleans, La. P. O. address, Birmingham, Ala.

CLASS OF 1885.

JULIAN SARGENT ALLEN, C. E., (Hartford, Conn.,) was born in Windsor Locks, Conn., January 8th, 1860. P. O. address, Hartford, Conn.

FABRICIANO BOTERO, C. E., son of Jose Maria and Rosalia Botero, was born July 4th, 1859, at Retiro, State of Antioquia, United States of Colombia. Studied three years in the University of Antioquia, and one year in the military school at Bogota; was employed also as a surveyor. Entered the Institute in

September, 1882. After graduation, was assistant engineer with Keystone bridge company, Pittsburgh, Pa., 1885–86, and sailed for home, United States of Colombia, August 19th, 1886, after an absence of five and a half years. P. O. address, Retiro, U. S. of Colombia, S. A.

ROBERT ANDREW CAIRNS, C. E., son of Robert and Matilda J. (Jones) Cairns, was born in Waterbury, Conn., December 2d, 1858. He prepared at the Waterbury English and Classical School, Rev. Isaac Jennings, principal, and entered the Institute February 4th, 1882. Was engaged in professional work during the summers of 1883, '84 and '85, in the office of the city surveyor of Waterbury. Learned the trade of a machinist from 1877 to 1881, with the Waterbury brass company. 1885, assistant in descriptive geometry and drawing in the Institute. P. O. address, 46 Seventh street, Troy, N. Y.

ELIAS CHESROWN, C. E., son of Lewis and Elizabeth (Redd) Chesrown, was born in Molucan, Oakland county, O., January 20th, 1860. He prepared for the Institute at Buchtel College, Akron, O., and entered September, 1883. Assistant engineer on Burlington & Missouri River railroad in Nebraska. P. O. address, Lincoln, Neb.

ANDREW CHASE CUNNINGHAM, C. E., son of Thomas and Celeste E. (Chase) Cunningham, was born in Mohawk, Herkimer county, N. Y., February 15th, 1858. Entered the United States Naval Academy, June 9th, 1874, and was graduated June 10th, 1879. Was in active service in the United States navy to February, 1883, when he resigned to enter the Institute. In 1885, assistant engineer Massillon bridge company, O.; 1886, civil engineer, Omaha, Neb. Married, June 18th, 1879, Jessie E. Thomas, daughter of George M. Thomas. One child. P. O. address, Mohawk, N. Y.

JOHN COUPER EDWARDS, C. E., son of Lewis A. and Elizabeth R. (Couper) Edwards, was born in New Castle, Del., February 8th, 1864. He prepared at Boys' High School, Washington, D. C., and entered the Institute June 10th, 1881. At present student of law. P. O. address, 1408 L. street, N. W., Washington, D. C.

GRIFFITH MORGAN ELDRIDGE, B. Ph., C. E., son of Erwin J. and Emma L. (Ronaldson) Eldridge, was born at Flat Pond, Lee county, Ga., August 19th, 1862. He graduated at the University of Georgia in 1881, with degree of B. Ph., and entered the Institute September 13th, 1881. At present assistant engineer Savannah, Dublin & Western railroad. P. O. address, Americus, Ga.

CLARENCE ALANSON FOWLER, C. E., son of Milton Alanson and Katherine Putnam (Sikes) Fowler, was born at Fishkill, Dutchess county, N. Y., November 19th, 1864. Attended the Poughkeepsie Military Academy, Poughkeepsie, N. Y.; in 1881, was rodman on Kinzua division of Erie coal and oil extension; 1886, assistant engineer with Kemble iron company, Riddlesburgh, Pa. Entered the Institute in September, 1882. P. O. address, Riddlesburgh, Pa.

OVIDIO GIBERGA, C. E., was born in Havana, Cuba, April 7th, 1863. Entered the Institute in 1881. After graduation he entered the senior class of Stevens Institute of Technology, Hoboken, N. J., for a course in mechanical engineering. He returned home in the summer of 1886. P. O. address, Havana, Cuba.

THEODORE STARBUCK HAIGHT, C. E., son of Samuel and Helen M. (Vassar) Haight, was born in Brooklyn, N. Y., June 21st, 1864. Prepared at Ballston High School. Entered the Institute in September, 1881. At present engaged in the manufacture of leather. P. O. address, Ballston, N. Y.

WILLIAM HENRY HASSINGER, C. E., son of Jacob and Catherine (Schuber) Hassinger, was born in New Orleans, Orleans parish, La., May 25th, 1863. Prepared at Bellevue High School, Virginia. Entered the Institute September 16th, 1881. Since graduation he has been connected with steel works in Pittsburgh, Pa., and Youngstown, O., as chemist. P. O. address 172 Jackson street, New Orleans, La.

EUGENE BLEYTHING HEDDEN, C. E., son of Viner Jones and Elmira Vader (Meeker) Hedden, was born at East Orange, Essex county, N. J., May 11th, 1862. He attended the Eastern District public school, and entered the Institute in September,

1881. Since graduation, has been employed at the Riverside bridge and iron works, Paterson, N. J. Member of the Rensselaer Society of Engineers. Married, September 30th, 1886, Hattie Harrison, of East Orange, N. J. P. O. address, V. G. Hedden & Sons, Newark, N. J.

JAMES HETZEL, C. E., son of George and Mary Louisa (Siegrist) Hetzel, was born at Allegheny city, Allegheny county, Pa., March 31st, 1861. Attended Wilkinsburg public school, Allegheny county; was draughtsman with the Westinghouse air brake company, Pittsburgh, Pa. Entered the Institute October 25th, 1881. Since graduation has been engineer to the Washington natural gas company, Pittsburgh, Pa. Member of the Rensselaer Society of Engineers. P. O. address, 60 Fourth avenue, Pittsburgh, Pa.

DWIGHT AARON HITCHCOCK, C. E., son of Aaron and Frances (Lamphere) Hitchcock, was born in Detroit, Wayne county, Mich., November 3d, 1861. Was prepared for the Institute by Prof. P. M. Patterson, Detroit, Mich., and entered September, 1880. Commencing in July, 1883, worked two months and a half on United States improvement of Detroit river, at Anderdon, Ontario. P. O. address, 86 Second street, Detroit, Mich.

HENRY WILSON HODGE, C. E., son of J. Ledyard and Susan S. (Wilson) Hodge, was born in Washington, D. C., April 14th, 1865. Prepared at Young's private school, Washington, D. C., and entered the Institute September 17th, 1882. After graduation was for a time with the Phœnix bridge company, Phœnixville, Pa. P. O. address, 1408 L street, Washington, D. C.

CHARLES HENRY JEWETT, C. E., son of John L. and Adeline U. (Walling) Jewett, was born in New York city, October 15th, 1864. Prepared at the College of the City of New York. Entered the Institute October 5th, 1881. In 1885 with the Gold mining company, near Redding, Shasta county, Cal. P. O. address, 425 West Twenty-first street, New York city.

HENRY ARTHUR LACHICOTTE, C. E., (Charleston, S. C.,) son of Philip Rossignol and Mary J. (Miscally) Lachicotte, was born in Georgetown county, South Carolina, November 7th, 1860. After taking a four years' course in the mathematical

and scientific departments of the College of Charleston, S. C., he entered the Institute in September, 1882. In 1885, assistant engineer Berlin bridge company, Binghamton, N. Y. Member of the Rensselaer Society of Engineers. P. O. address, Binghamton, N. Y.

JESSE LOWE, C. E., son of Jesse and Sophia (Hoppin) Lowe, was born at Omaha, Douglas county, Neb., January 7th, 1861. Prepared at Williston Seminary, Easthampton, Mass., and entered the Institute February 3d, 1882. In 1885, assistant engineer, Omaha belt railroad company; 1886, assistant engineer of the Birmingham bridge company. P. O. address, Birmingham, Ala.

EDGAR MARBURG, C. E., (Shreveport, La.,) son of Herman Edward and Clara B. (Jurgensen) Marburg, was born March 4th, 1864, in Hamburg, Germany, to which place, during the civil war, his father removed his family from New Orleans, La. Shortly after its close, they returned to New Orleans, remaining there until 1875. Since that year they have resided at Shreveport, La. From April 1, 1879, to May 1, 1882, was in the employ of R. N. McKellar, wholesale grocer and cotton factor, at Shreveport, La. Was fitted for the Institute by Captain George E. Thatcher, Shreveport, La., and entered September 17, 1882. Entered upon the work of his profession, July 1, 1885, with the Keystone bridge company. P. O. address, Pittsburgh, Pa.

JOSE CONTREIRAS MARTINS, C. E., son of Jose Contreiras da Silva and Dolores Martins, was born at Bage, Rio Grande do Sul, Brazil, May 26th, 1861. He prepared with Professor Ricketts, and entered the Institute September, 1881. P. O. address, Bage, Rio Grande do Sul, Brazil, S. A.

ANTONIO CARLOS D'AGUIAR MELCHERT, C. E., was born February 15th, 1862, in Itu, Sao Paulo, Brazil, S. A., his present P. O. address.

DAVID WHITE MCNAUGHER, C. E., son of Joseph and Jessie (White) McNaugher, was born at Allegheny City, Allegheny county, Pa., November 23d, 1860. Prepared at Westminster College Pa. Entered the Institute in September, 1881. In 1885

accepted position with the Troy iron and steel company as chemist. P. O. address, Troy, N. Y.

LEVERETT SALTONSTALL MILLER, C. E., son of George Macculloch and Elizabeth (Hoffman) Miller, was born in New York city May 23d, 1863. Attended the private school of Messrs. Gibbons & Beach, and for two years was under private instruction with J. R. Leslie, Newport, R. I. Entered the Institute in September, 1881. Commenced work of his profession October, 1885, as assistant engineer Denver, Utah & Pacific railroad, Denver, Col., remaining until August, 1886; August, 1886, to December, 1886, assistant engineer with the B. & M. railroad on survey in the Middle Park, Col. P. O. address, 270 Madison avenue, New York city.

NEIL ROBERT MONTGOMERY, C. E., (Trenton, N. J.,) son of A. R. and Margaret (Kernochan) Montgomery, was born at Pass Christian, Miss., October 19th, 1862. After graduation was appointed assistant engineer on the Baltimore & Ohio railroad, on Staten Island. P. O. address, New Brighton, Staten Island, N. Y.

THORNTON TAYLOE PERRY, C. E., son of Captain Roger and Estelle (Tayloe) Perry, was born at Cumberland, Md., September 10th, 1863. Prepared at the Virginia Military Institute, Lexington, Va., and entered the Institute in the fall of 1882. In the summer of 1885 he became assistant engineer in the Union steel works, Chicago, Ill. P. O. address, Union steel company, Chicago, Ill.

MARCUS HIRAM RANNEY, C. E., (Mohawk, N. Y.,) son of Hiram H. and Marayett (Warner) Ranney, was born at Devil's Lake, Wis., September 27th, 1863. Attended Peekskill Military Academy, and entered the Institute in September, 1881. Soon after graduation was appointed assistant engineer Delaware & Hudson canal company, Albany, N. Y. P. O. address, Albany, N. Y.

LUIS DE LA ROSA, JR., C. E., (San Luis, Potosi,) son of Luis and Marie (Berriozabal) de la Rosa, was born at Binos, state of Zacatecas, Mexico, October 5th, 1864. He took the six years' course at the Scientific Institute of San Luis Potosi,

Mexico. Was several times president of the Humboldt Scientific Society in San Luis, Potosi, Mexico. Entered the Institute in September, 1882. P. O. address, 72 Fifth avenue, New York city.

JAMES HARRISON WHITNER, C. E., son of B. F. and Anna (Church) Whitner, was born at Anderson Court House, S. C., August 15th, 1862. His preparation was made for the Institute at Bingham School, Meabansville, N. C., and Anderson Collegiate Institute, Anderson, S. C. With engineer corps Savannah Valley railroad, S. C. Entered the Institute October 3d, 1881.

CLASS OF 1886.

HUGH ANDERSON, C. E., son of John Anderson and S. M. (Rogers) Anderson, was born at Riga, Monroe county, N. Y., September 10th, 1862. His occupation was farming. Prepared at the Rochester Free Academy, and entered the Institute in the fall of 1882. P. O. address, Riga, Monroe county, N. Y.

RICARDO MANUEL ARANGO, C. E., son of Jose Agustin and Josefa Matilde (Chiari) Arango, was born at Panama, United States of Colombia, South America, December 25th, 1865. Attended School of Mines preparatory school, New York city, and entered the Institute in September, 1883. P. O. address, Panama, United States of Colombia, S. A.

EDWARD OAKLEY BIRD ASHBY, C. E., (Erie, Pa.,) son of John E. and Hannah (Van Velsor) Ashby, was born in Buffalo, Erie county, N. Y., May 23d, 1863. Graduated from the classical department of the Erie High School, Erie, Pa. Entered the Institute in September, 1882.. In 1886 assistant engineer Pennsylvania railroad. P. O. address, Williamsport, Pa.

JOHN JACOB BERGER, C. E., son of Rev. Martin Luther and Cecelia (Chace) Bergen, was born at Millstone, Somerset county, N. J., November 5th, 1865. He attended Hayes Valley Grammar School, San Francisco, Cal., from 1875 to 1879; district school, Claverack, N. Y., Prof. Bunce, from 1880 to 1881; Claverack Academy, Claverack, N. Y., fall of 1881; Cornwall

Heights school, Cornwall-on-Hudson, Profs. Cobb, Houston & Van Taube, from January to Iuly, 1882. Entered the Institute in the fall of 1882. In September, 1886, he entered Cornell University for a special course in mechanical engineering. Member of the Rensselaer Society of Engineers, Troy, N. Y. P. O. address, Claverack, Columbia county, N. Y.

JAMES HENRY CALDWELL, B. S., (Irvington-on-Hudson, N. Y.,) son of Edward Henry and Caroline (Shields) Caldwell, was born in Mobile, Montgomery county, Ala., March 21st, 1865. Entered the Institute September, 1882. P. O. address, Irvington-on-Hudson, N. Y.

WILLIAM VINCENT CALLERY, C. E., son of James and Rose A. (Downing) Callery, was born in Allegheny City, Allegheny county, Pa., April 5th, 1865. Prepared with Rev. P. W. Power, and entered the Institute September, 1882. P. O. address, 23 Union avenue, Allegheny City, Pa.

JOHN CHAMBERS, C. E., son of Henry and Annie C. (Weisiger) Chambers, was born in Louisville, Jefferson county, Ky., March 14th, 1864. Attended the Louisville Male High School, completing the junior year; entered the Institute September, 1882. In the fall of 1884 was draughtsman and first assistant to the chief of exhibits department at the Southern Exposition, held at Louisville, Ky. Fall of 1886, assistant engineer Louisville & Nashville railroad. P. O. address, 402 Ormsby avenue, Louisville, Ky.

FREDERICK MARCUS CUMMINGS, C. E., son of Marcus F. and Carrie M. (Wood) Cummings, was born in Troy, N. Y., June 6th, 1867. Prepared at the Troy Academy and entered the Institute September, 1882. At present student of architecture. P. O. address, 87 Grand Division street, Troy, N. Y.

JOHANNES HEINRICH CUNTZ, C. E., son of Emil August Heinrich and Frances (Cooper) Cuntz, was born at Hoboken, Hudson county, N. J., August 9th, 1866. Prepared for the Institute at Hoboken Academy, and entered in September, 1882. July, 1883, was employed on Croton river and lake, one month. In September, 1886, he entered Stevens Institute for a special

course in mechanical engineering. P. O. address, 137 Hudson street, Hoboken, N. J.

EZEKIEL CLAY DAVENPORT, C. E., son of Col. H. B. and Martha I. (Clay) Davenport, was born at Paris, Bourbon county, Ky., January 9th, 1864. Prepared for the Institute at Shenandoah Academy, and entered in September, 1882. P. O. address, Charlestown, Jefferson county, W. Va.

HENRY CLAY BEDINGER DAVENPORT, JR., C. E., son of Colonel Henry Bedinger and Martha I. (Clay) Davenport, was born in Paris, Bourbon county, Ky., February 11th, 1865. Prepared for the Institute at St. John's College, Annapolis, Md., and entered in September, 1882. P. O. address, Charlestown, Jefferson county, W. Va.

TRACY COREY DRAKE, B. S., son of John B. and Josephine C. (Corey) Drake, was born in Chicago, Cook county, Ill., September 12th, 1864. Received his preparation at Trinity School, Tivoli-on-Hudson, N. Y. Passed examinations in June, 1882, and entered the Institute in September, 1882. Traveled in Northern Europe in the summer of 1884, and in Southern Europe in the summer of 1886. In October, 1886, commenced hotel business in Chicago, Ill. Member of the Norske Turistforenings, Christiania, Norway. P. O. address, Grand Pacific hotel, Chicago, Ill.

MARMADUKE WARD EASBY, C. E., (Media, Pa.,) son of William and M. A. (Haskins) Easby, was born in Philadelphia, Pa., December 18th, 1865. Prepared by Miss M. A. Walter, A. M., of Media, Delaware county, Pa., and entered the Institute in September, 1882. September, 1886, with the Phœnix bridge company, Phoenixville, Pa. P. O. address, Media, Delaware county, Pa.

PAUL HASKINS EASBY, C. E., (Media, Pa.,) son of William and Mary Ann (Haskins) Easby, was born in Philadelphia, Pa., August 28th, 1864. Prepared at Friends' Central School, Philadelphia, Aaron B. Ivins, teacher, and entered the Institute in the fall of 1882. September, 1886, assistant engineer Pennsylvania railroad. P. O. address, Media, Delaware county, Pa.

HENRY MARTYN FAIRCHILD, C. E., son of Horace J. and Maria Louise (Stiles) Fairchild, was born in New York city, December 28th, 1862. Attended Trinity School, Tivoli-on-Hudson, N. Y. Resided in Manchester, England. Entered the Institute September, 1882. P. O. address, Bellport, Long Island, N. Y.

DEAN FISH, B. S., son of James D. and Mary E. (Blodget) Fish, was born in Brooklyn, Kings county, N. Y., April 30th, 1864. Prepared at Brooklyn Collegiate and Polytechnic Institute, and entered the Institute September, 1881. P. O. address, 153 Maiden Lane, New York city.

ALBERT LOUIS HAUCK, C. E., (Cincinnati, O.,) son of Frederick and Margaret (Ahlers) Hauck, was born at Lawrenceburgh, Dearborn county, Ind., December 24th, 1861. He served three years' apprenticeship as a miller. Prepared at Cincinnati public schools and with Miss Celia Doemer. Entered the Institute in 1882. Member of the Rensselaer Society of Engineers. P. O. address, 628 Central avenue, Cincinnati, O.

WILLIAM CHAUNCEY HAWLEY, C. E., son of Charles Townsend and Frances S. (Warner) Hawley, was born in Cambridge, Washington county; N. Y., August 31st, 1865. Prepared for the Institute at Washington Academy, Salem, N. Y., and entered in the fall of 1882. Civil engineer for Cambridge water works company, Cambridge, N. Y. P. O. address, Cambridge, N. Y.

THEODORE ROCKWELL HINSDALE, C. E., (Washington, D. C.,) son of Solomon Rockwell and Julia Merritt (Jackson) Hinsdale, was born at Ellaville, Prince George county, Md., January 31st, 1865. Prepared for the Institute at Rittenhouse Academy, Washington, D. C., and entered September 22d, 1882. P. O. address, West Winsted, Conn.

JAMES BERNARD HOPKINS, C. E., son of John and Bridget M. (Mahan) Hopkins, was born at Waterloo, Seneca county, N. Y., November 26th, 1863. Prepared for the Institute at Waterloo Union School, and entered September, 1882. Assistant engineer Waterloo water works. P. O. address, Waterloo, N. Y.

PAUL WALLACE HORBACH, C. E., son of John A. and Sarah (Wallace) Horbach, was born at Omaha, Douglas county, Neb.,

July 21st, 1863. Prepared at Highland Falls Academy, Orange county, N. Y., and entered the Institute February, 1883. Traveled in Europe summer and fall of 1886. P. O. address. Omaha, Neb.

GEORGE SCOTT HUBBELL, C. E., (Buffalo, N. Y.,) son of Nathan and Carrie F. (Scott) Hubbell, was born in Troy, N. Y., September 29th, 1864. Prepared at the Buffalo Classical School, Buffalo, N. Y., and entered the Institute September, 1882. October, 1886, assistant engineer Nickel Plate railroad, Cleveland, O. P. O. address, 363 Delaware avenue, Buffalo, N. Y.

AUGUSTUS SAYRE KIBBE, C. E., (Brooklyn, N. Y.,) son of Augustus F. and Sarah A. (Sayre) Kibbe, was born in Albany, N. Y., August 8th, 1865. Prepared at the Brooklyn Polytechnic Institute, and entered the Institute in September, 1883, division C. September, 1886, appointed assistant in Geodesy in the Institute. Married, December 5th, 1885, Mary Farnsworth Sullivan, daughter of John Sullivan, of Albany, N. Y. P. O. address, Troy, N. Y.

FREDERICK NATHANIEL KIMBALL, C. E., (Albany, N. Y.,) son of Charles Edward and Abbie Kimball (Gould) Kimball, was born in Boston, Mass., November 2d, 1865. Prepared at the Riverview Academy, and entered the Institute September 17th, 1882. Fall of 1886, assistant engineer on State survey in the Adirondacks. P. O. address, 30 Willett Street. Albany, N. Y.

JOHN KNICKERBACKER, C. E., (Troy, N. Y.,) son of Thomas A. and Helen L. Jones Knickerbacker, was born in West Troy, Albany county, N. Y., May 3d, 1866. Prepared with Prof. T. Newton Wilson, Troy Academy, Troy, N. Y. Entered the Institute in June, 1882. Traveled in Europe in the summer of 1886, and entered Cornell University for a special course in mechanical engineering in September, 1886. P. O. address, Troy, N. Y.

THOMAS FRANCIS LAWLOR, C. E., son of M. and Ellen (Ringwood) Lawlor, was born at Poughkeepsie, Dutchess county, N. Y., April 19th, 1866. Prepared at the Poughkeepsie High School, and entered the Institute September, 1882. Fall of

1886, assistant engineer Poughkeepsie & Southeastern railroad. P. O. address, 90 South Hamilton street, Poughkeepsie, N. Y.

HENRY VINCENT MACKSEY, C. E., (Boston, Mass.,) son of Joseph and Catharine (Fleming) Macksey, was born at Bridgewater, Mass., November 1st, 1860. Attended Boston Public schools; occupation, silver plater, printer, clerk; entered the Institute September, 1882. Summer of 1886, with I. B. & W. B. Hammond, civil engineers and contractors, Boston, Mass.; October, 1886, employed at the Pencoyd iron works. P. O. address, Pencoyd, Pa.

WILSON MCCLELLAND, C. E., son of Thomas W. and Anna M. (Knapp) McClelland, was born at Davenport, Scott county, Ia., March 28th, 1864. He graduated from the Davenport High School in 1882, and entered the Institute in fall of same year. P. O. address, 121 E. Sixth street, Davenport, Ia.

ADOLFO CARLOS MUNOZ DEL MONTE, A. B., C. E., son of Adolfo Munoz del Monte y Justiz and Juana (Poëy) Munoz del Monte, was born in Havana, Cuba, February 11th, 1864. Received the degree of "Bachiller en Artes y Oficios," from the Institute of San Isidro, Madrid, Spain. Entered the Institute September, 1882. September, 1886, entered Columbia College, New York city, for a special course in architecture. P. O. address, Zeta Psi room, 11 Second street, Troy, N. Y.

ALECK JOSEPH NORRIS, C. E., (Marshall, Va.,) son of H. D. B. and Edna (Bach) Norris, was born in Vera Cruz, Mexico, November 4th, 1864. Prepared at the Shenandoah Valley Academy, Winchester, Va., and entered the Institute September, 1882. P. O. address, Marshall, Fauquier county, Va.

JAMES IVES PLUMB, C. E., son of Neale and Sarah C. (Ives) Plumb, was born in San Francisco, Cal., October 12th, 1863. Resided at Islip, L. I.; Paris, France; New York city; prepared with Col. H. C. Symonds, Sing Sing, N. Y., and entered the Institute in June, 1882. Married, September 1st, 1886, Anna P. Burton, daughter of Dr. M. H. Burton, of Troy, N. Y. P. O. address, Islip, L. I.

JOHN VAN WICHEREN REYNDERS, C. E., son of John and Marie Louise (Sellers) Reynders, was born in Hoboken, N. J., December 17th, 1866. He prepared for the Institute at the Hoboken Academy and at the Gymnasium, Wesel, Germany, and entered September, 1882. P. O. address, 303 Fourth avenue, New York city.

GEORGE DE LA ROSA, C. E., son of Luis and Maria Berriozabal de la Rosa, was born in San Luis Potosi, Mexico, April 23d, 1868. He prepared for the Institute with Narciso Armenta, San Luis Potosi, and entered September, 1882. P. O. address, San Luis Potosi, Mexico.

EDWIN NASH SANDERSON, C. E., (Fort Edward, N. Y.,) son of Elnathan Lawrence and Mary Elizabeth (Nash) Sanderson, was born in Brooklyn, Kings county, N. Y., December 2d, 1862. He prepared for the Institute at Fort Edward Collegiate Institute and Brooklyn Polytechnic Institute, and entered September 17, 1882. September, 1886, entered Cornell University for special course in mechanical engineering. Was for some time bookkeeper in New York city. Member of Rensselaer Society of Engineers. P. O. address, Fort Edward, N. Y.

SAMUEL FELLOWS SELDEN, C. E., (Erie, Pa.,) son of Samuel and Caroline M. (Perkins) Selden, was born in Manchester, Erie county, Pa. Entered the Institute September, 1882. Traveled in Europe summer and fall of 1886. P. O. address, Erie, Pa.

MORRIS ROBESON SHERRERD, C. E., (Belvidere, N. J.,) son of Samuel and Frances M. (Hamilton) Sherrerd, was born at Scranton, Lackawanna county, Pa., December, 1865. Prepared at Blair Presbyterian Academy, Blairstown, N. J., and entered the Institute October, 1882. After graduation, engaged for a short time at the Troy iron and steel works, and in September, assistant engineer Beech Creek railroad, Jersey Shore, Pa. P. O. address, 16 Seventh street, Troy, N. Y.

HOWARD HART SHIELDS, B. S., son of Hamilton Le Roy and Caroline White (Hart) Shields, was born in Troy, N. Y., April 18th, 1865. Prepared with T. Newton Willson, of Troy Academy, and P. C. Ricketts. Entered the Institute September, 1882.

Fall of 1886, assistant engineer Troy Citizens' gas works. P. O. address, Troy, N. Y.

GEORGE RICHARDS SIKES, C. E., son of Samuel Darby and Susan Louisa (Richards) Sikes, was born in Buffalo, Erie county, N. Y., July 27th, 1863. Prepared at the Buffalo High School, Ray T. Spencer, principal. Entered the Institute September, 1882. Fall of 1886, assistant engineer Pennsylvania railroad. P. O. address, 291 Niagara street, Buffalo, N. Y.

STEWART KEDZIE SMITH, C. E., son of George A. and Catharine B. Smith, was born at Somerset, Hillsdale county, Mich., January 9th, 1864. Occupation, farmer; prepared at Oberlin College, Ohio, and entered the Institute September, 1883. P. O. address, Somerset, Hillsdale county, Mich.

BEN ALEXANDER STRIBLING, C. E., son of Thomas Hale and Eleanor (Alexander) Stribling, was born in San Antonio, Bexar county, Texas, February 9th, 1863. Prepared at Ury House School, Philadelphia, Pa., Fox Chase, principal. Entered the Institute September 15th, 1882. In August, 1886, assistant engineer, Utah & Northern railroad; October, 1886, employed by United States electric light company, Newark, N. J. P. O. address, 5 Pecan street, San Antonio, Texas.

SUMNER LA RUE TONE, C. E., son of Thomas J. and Delia (Spafford) Tone, was born in Cincinnati, Hamilton county, O., November 1, 1864. Resided in Bergen, Genessee county, N. Y.; prepared at Brockport State Normal School, and entered the Institute September, 1882. Member of Rensselaer Society of Engineers. P. O. address, Bergen, Genessee county, N. Y.

ROBERT GEORGE TURKNETT, C .E., son of George Allen and Minerva (Bigelow) Turknett, was born in Columbia county, Florida, September 25th, 1863. Prepared for the Institute at North Division High School, Chicago, and entered September, 1882. Fall of 1886, assistant engineer American bridge and iron company, Chicago, Ill. Member of Rensselaer Society of Engineers. P. O. address, 126 State street, Chicago, Ill.

WILLIAM WEIGHTMAN WALKER, C. E., (Williamsport, Pa.,) son of R. J. C. and A. M. Walker, was born in Philadelphia, Pa.,

January 6th, 1865. Residence, Williamsport, Penn. Tutor, E. B. Hunt. Entered the Institute May 30th, 1882. Entered Jefferson Medical College, Philadelphia, Pa., October, 1886. P. O. address, 112 South Eighteenth street, Philadelphia, Pa.

VINCENT BLOSS WARD, C. E., son of Cyrus M. and Mary E. (Phillips) Ward, was born in Troy, N. Y., August 5th, 1865. Prepared at Troy Academy, and entered the Institute September, 1882. Fall of 1886, engaged in hydraulic mining in Idaho. P. O. address, 267 River street, Troy, N. Y.

OSWALD EMMERT WINGER, C. E., (Freeport, Ill.,) son of Elam B. and Elizabeth B. (Stover) Winger, was born at Clay Lick, Franklin county, Pa., February 19th, 1862. Attended Freeport High School, Freeport, Ill., and entered the Institute in September, 1882. October, 1886, assistant engineer Illinois Central railroad, air line, Chicago, Madison & Northern. His residence for five years previous to entering was at Freeport, Ill.; occupation, inventor, having received five United States patents. Member of the Rensselaer Society of Engineers, Troy, N. Y. P. O. address, Freeport, Ill.

OCTAVIO AUGUSTUS ZAYAS, C. E., son of Joseph and Leocadia (Adan) Zayas, was born at Puerto Principe, Cuba, August 30th, 1865. Graduated from the public schools, New York city; attended the College of the City of New York four or five months; prepared for the Institute under a tutor, and entered in September, 1882. Assistant engineer on the sewerage system, Orange, N. J., September, 1886. P. O. address, 165 West Thirty-fourth street, New York.

MEMBERS OF THE INSTITUTE

Who did not complete the full course.

Many of these, especially in the earlier years, entered for a year, a term, or for even a single course of lectures, and were not candidates for a degree.

The years denote the time of entering, without regard to Class or length of time in attendance.

1824-6.

ANSON P. BEBEE,.....Canaan.
DANIEL B. CADY, ...Schoharie.
LUTHER CROSS,.....Grafton, N. H.
THOMAS HURD EATON,.....Troy.
JONATHAN ELY, A. M.,.....Chittenango.
RICHARD H. HALE, M. D., ...Troy.
WILLIAM G. HANAFORD,.....Enfield, N. H.
OSCAR HANKS,.....Troy.
WILLIAM A. KING,.....Philadelphia, Pa.
JAMES N. TRIMBLE, ...Hillsboro, O.
GEORGE W. WESTON,.....Sandy Hill.
RICHARD H. WILLIAMS, ...Middlesex.

1826-8.

AUGUSTUS BAGLEY, ...Staten Island.
JOHN R. BIGELOW,.....Cummington, Mass.
NATHAN BROCKWAY,.....Oswego.
JOHN HOWARD BRYANT,.....Cummington, Mass.
SAMUEL BUELL,.....Troy.
MARCH CHASE, ...Drewsville, N. H,
LEWIS T. COBB,.....Cummington, Mass.
*AUGUSTUS COLLINS, ...Sparta, Ga.
WILLIAM CORNELL,.....Troy.
*AMOS B. EATON,.....Troy.
BELA FOSTER, A. B., ...Hanover, N. H.
DARWIN GIBSON,.....Sandy Hill.
WILLIAM A. HITCHCOCK, M. D., ...Orwell, Vt.
FERRIS JACOBS, ...Schoharie.
ROBERT MCMANUS, ...Troy.

* Deceased.

ROBERT PETER, JR.,.....Pittsburgh, Pa.
*AUGUSTUS PITCHER,.....Albany.
GEORGE PHILIP,..... ....Claverack.
THOMAS W. PRATT,.....Boston, Mass.
BENJAMIN RICHARDS, ...White Creek.
JOSEPH RICHARDS, M. D., ...White Creek.
GEORGE W. SEWARD,.....Warwick.
CHARLES SHERWOOD,.....Elmira.
GEORGE SMITH,.....Henrietta.
*COURTLAND VAN RENSSELAER, A. B.,....Albany.
GEORGE WILLIAMS,.....Troy.
*JOHN WRIGHT, M. D.,..... .....Troy.

1828-30.

WILLIAM AIKEN, M. D., ...Onondaga.
FRANKLIN BRADLEY, M. D., ...Manchester, Vt.
LEGRAND B. CANNON,.....Troy.
JOHN CASSIDY, ...New York.
*ELIPHALET CRAMER, ...Troy.
MARTIN CRANDALL,.....Sandlake.
*CHARLES S. DISBROW,.....Troy.
*JAMES B. DUNGAN,.....Canandaigua.
WILLIAM B. EATON,.....Troy.
CHARLES H. FELLOWS, ...Troy,
ASA E. FOSTER,.....Erie, Pa.
WILLIAM H. FREELAND,.....Claverack.
JOHN F. FRENCH,.....Hartford.
CHARLES GARDNER, ...Troy.
JOHN H. HAYNES, ...Nassau.
CALVIN HOLLISTER, ...Pawlet, Vt.
AMOS S. HUTCHISON,..... .....Ackworth, N. H.
HOLLISTER LATHROP, ...Sherburne, Mass.
REV. MR. LEAVENWORTH, ...Missionary.
PHILANDER MOORE,.....Fort Ann.
GEOROE M. NOBLE, ...Tinmouth, Vt.
JAMES PICKETT, ...Pittstown.
FRANKLIN PIERCE,.....Ontario.
F. W. POWELL,.....Middlebury, Vt.
CHARLES ROBERTSON, ...Curacoa, W. I.
AUGUSTUS SLINGERLAND, ...Albany.
JOHN THOMSON,.....Albany.
CHARLES F. TUTTLE,.....Troy.
E. VAN ALLEN, ...Bloomingdale.
JOSEPH M. WARREN, ...Troy,
DANIEL WILLIAMS,.....Troy.
EDWIN WILMARTH, ...Salem.

1830-4.

ELMER W. ADAMS,.....Canton, Conn.
ORLA BEALS, ...Lansingburgh.
WILLIAM H. BEARS,.....Newbern, N. C.
WILLIAM W. BROCKWAY,.....Troy.
JOHN G. BUEL,.....Troy.
DANIEL H. BURTIS, ...Troy.
ELIAM E. BARNEY, ...Lowville.
THEODORE E. CLARK,.....———
GEORGE H. CRAMER, ...New York.
*EDWARD O. EATON .....Troy.
DAVID S. EIGENBRODT, M. D., ...Jamaica, L. I.
A. W. FISHER,.....Halifax, Vt.
CHARLES FREIOT,.....Troy.
JOSEPH GARY, JR., ...Troy.
THOMPSON HOLLISTER,.....Troy.
WILLIAM HOLLISTER,.....Troy.
CALVIN HUNTINGTON, ...Vermont.
HENRY LANE, ...Troy.
WILLIAM LANSING,.....Lansingburgh.
FRANCIS R. LIVINGSTON, ...Red Hook.
JAMES S. MAY, ...Pittstown.
JOHN K. MYERS,.....Whitehall.
WILLIAM H. MORTON,.....Nassau.
*CHARLES L. PRESCOTT,.....Troy.
ALBERT E. POWERS,.....Lansingburgh.
WILLIAM E. READ,.....Pittstown.
REV. GEORGE SCARBOROUGH,.....Brooklyn, Conn.
WILLIAM R. SCHUYLER,.....Ovid.
CHARLES SHERWOOD,.....Elmira.
CHARLES SMITH, ...Coeymans.
ISAAC SMITH,.....New York.
JOHN W. SPRAGUE,.....Troy.
HENRY M. SWIFT, ...Georgia.
JOSIAH M. TALBOTT, ...Maine.
ASA P. THAYER,.....Troy.
CHARLES C. TRACY, ...Troy.
JAMES W. UNDERHILL, ...Troy.
STEPHEN WICKES, M. D.,.....Jamaica, L. I.
*JOHN H. WILLARD, ...Troy.
JOSEPH L. WHITE,.....Cherry Valley.

1834-5.

*OLIVER A. ARNOLD,.....Troy.
HALL JACKSON BIRGIN,.....Athenstown, N. H.
*PETER A. BURDEN,.....Troy.

WILLIAM HOLLIS CADES,.....Albany.
GARRET DRAKE, ...Troy.
*CUVIER EATON,.....Troy.
ZINA PITCHER EGLESTON,.....Troy.
PETER FELLOWS,.....Greenbush.
NATHAN D. GARNSEY,.....Clifton Park.
JOSEPH S. GARY,.....Troy.
WILLIAM S. HAIGHT,.....Troy.
JOSEPH ABEL HASKINS,.....Brunswick.
LANSING HODGEMAN,.....Stillwater.
*ARTHUR HANKS,.....Troy.
CHARLES HENRY LINDLEY,.....Troy.
CHARLES NICHOLS LOCKWOOD,.....Troy.
PETER GEORGE PHILIP, ...Claverack.
*LEWIS L. SOUTHWICK,.....Troy.

1835-6.

HENRY G. ADAMS, ...Brunswick.
NELSON B. BETTS, ...Troy.
JACOB HENRY DATER,.....Troy.
WILLIAM R. GUEST,.....New York.
HENRY W. HEWITT, ...Troy.
*JOHN T. HOGEBOOM,.....Hudson.
CHARLES MILLER, ...Truxton.
EDWARD MOORE, M. D.,.....Rochester.
DAVID PRICE,.....Troy.
CHARLES H. RUSSELL,.....Hebron.
*SAMUEL SHERRERD, ...Belvidere, N. J.
H. MARTIN SMITH,.....West Troy.
JOSEPH O. SMITH,.....Caledonia.
WARREN S. SMITH,.....New Brunswick, N. J.
JAMES A. SUFFERN,.....Haverstraw.
*THOMAS A. TILLINGHAST,.....Troy.

1836-7.

HENRY ANDREWS, ...——
ROYAL WHEELER BAKER,.....Fort Ann.
JOHN T. BLATCHFORD, ...Troy.
THEODORE F. BOUDINOT, ...Parsippany.
JOSEPHUS C. BROCKWAY,.....Middlebury, Vt.
JOHN BULL, ...Canandaigua.
NATHAN H. CAMP,.....Troy.
WILLIAM B. CONSTABLE,.....Schenectady.
ANDREW B. CROSS,.....Saratoga.
ANDREW A. DOUGLASS,.....Stephentown.
WILLIAM HILLHOUSE, ...Watervliet.
JOHN HOOPER,.....Troy.

ISAAC LAW, ...Salem.
JONATHAN H. MERRITT, ...Half Moon.
SAMUEL J. MILLS, ...Guilford, Conn.
SILAS C. NEWTON, ...Glen's Falls.
JACOB PAINTER, ...Middletown, Pa.
PETER H. RICE, ...Whitehall.
STOUGHTON N. TAYLOR, ...Ballston.
WESTERLO VAN RENSSELAER, ...Albany.
ADDISON G. WILLIAMS, ...Pompey.
*CHARLES M. YVONNETT, ...Troy

1837-8.

CHARLES O. BENEDICT, ...Saratoga.
CYRUS BENTLEY, ...New Lebanon.
ALBERT W. CURTIS, ...Sheffield.
MATTHEW DORR CLARK, ...West Bloomfield.
JAMES T. CORNELL, ...Wilton.
PRESTON DENTON, ...Saratoga.
*RUTGER L. DRAKE, ...Troy.
MARK S. DICKERMAN, ...Troy.
*THEODORE D. JUDAH, ...New York.
CHARLES R. MALLORY, ...Austerlitz.
EDWARD E. SPOOR, ...Avon, Conn.
W. W. THEOBALD, ...Albany.
JOHN GEORGE WHITTAKER, ...New York.

1838-9.

SAMUEL C. BIGELOW, ...Troy.
JAMES A. BRAZELTON, ...Newmarket, Tenn.
REUBEN BUCK, ...Waterford.
JAMES L. CRAMER, ...Northumberland.
JOHN C. CRAMER, ...Waterford.
ISAAC DRAKE, ...Troy.
*J. HUMBOLDT EATON, ...Troy.
RICHARD H. FRANCHOT, ...Butternuts.
GEORGE N. GATES, ...Louisiana.
*CHARLES S. HEARTT, ...Troy.
PETER A. LADIEU, ...Troy.
GERRITT G. LANSING, ...New York.
WILLIAM MILLS, ...Troy.
ROBERT W. RUTHERFORD, ...Lodi, N. J.
SYLVESTER E. SPOOR, ...Troy.
WILLIAM S. STEDMAN, ...Troy.

1839-40.

WILLIAM H. COLE, ...Watervliet.
HUGH CONNITY, ...Waterford.

IRA FORD, ... Hoosack.
*ROBERT LAY, ... Springfield.
HIAL KENYON PARSONS, ... Colebrook, N. H.
WILLIAM MCMANUS STORM, ... Eaton.
*WILLIAM G. VOUGHT, ... Victor.
HERMAN WHIPPLE, ... Shaftsbury, Vt.
JOHN D. YATES, ... Schenectady.

1840-41.

SEWELL W. HALL, ... Troy.
EZRA E. HOWARD, ... Williamsville.
WILLIAM A. LEE, ... Granville.
WILLIAM H. PRATT, ... Chatham.
GEORGE N. SHARP, ... Troy.
JOHN B. TIBBITS, ... Troy.

1841-2.

ELIJAH BRYAN, 2D, ... Schaghticoke.
JOHN H. COOK, ... Hanover, N. Y.
G. MERRIAM FISHER, ... Lansingburgh.
ERASTUS GEER, ... Troy.
JOHN P. REILAY, ... Troy.
WILLIAM H. ROSSITER, ... Troy.
JOHN SHAW, ... Troy.
JAMES H. SHERRILL, ... New Hartford.
GRAHAM R. WICKES, ... Troy.

1842-3.

WILLIAM BONESTEEL, ... Grafton.
CLARENCE BUEL, ... Troy.
JOHN G. BUSWELL, ... Troy.
GEORGE E. DOUGLASS ..... New York.
JOHNSON H. EATON, ... Troy.
FRANCIS K. FIELD, ... Malden.
DERRICK LANE, ... Troy.
SIDNEY W. PARK, ... Troy.
NATHANIEL B. POWERS, ... Lansingburgh.
ADAM R. SMITH, ... Troy.
STEPHEN SWEET, ... Watervliet.
*BRAINE WALSH, ... Lansingburgh.

1843-4.

RICHARD D. BLOSS, ... Troy.
OLIVER T. BURT, ... Syracuse.
CHARLES E. CALENDER, ... Manlius.
JAMES R. CHAMBERLIN, ... Troy.

CHARLTON H. DAVIS,.....Troy.
JOSEPH K. DOWNING, ...Bristol, Pa.
GEORGE H. EATON, ...Troy.
ISAAC M. MCCONIHE, ...Troy.
WILLIAM R. SHAW, ...Troy.

1844–5.

*H. W. BRINSMADE,.....Troy.
THEODORE BROOKS, ...Brunswick.
WILLIAM H. BULL,.....Troy.
JOHN S. CRARY, ...Salem.
JOHN W. DORLON, ...Troy.
LOUIS A. FELLOWS, ...Troy.
LUSHER GAY,.....Troy.
GEORGE C. HALL,.....Troy.
HENRY S. HATCH, ...Troy.
JONAS S. HEARTT, ...Troy.
ALBERT HOLTON, ...Troy.
EDWARD HUBBELL,.....Troy.
HENRY G. LANDON, ... Troy.
WILLIAM W. MCCONIHE, U. S. A.,.....Troy.
ROBERT F. SILLIMAN,.....Troy.
JOHN H. WARREN,.....Troy.
JOHN P. WILLARD,..... .....Troy.

1845–6.

HALSY BRAINARD,.....Troy.
*WILLIAM F. BURDEN,.....Troy.
WILLIAM H. BURTIS,.....Troy.
MATTHIAS M. COOK,.....Hanover, N. J.
CHARLES R. GOODRICH,.....Lansingburgh.
JAMES A. GRAY,.....Herkimer.
JOHN S. MALLARY,.....Troy.
HIRAM MCCHESNEY, ...Troy.
SAMUEL L. PALMER,.....Chatham.
GEORGE PEACOCK,.....Troy.
WILLIAM POWERS, ...Lansingburgh.
JEDEDIAH RANDALL,.....Norwich.
ROBERT M. RANDALL, ...Syracuse.
JAMES T. SARGENT, ...Sandy Hill.
NICHOLAS G. VAN MEERTEN,.....Paramarabo.
NICHOLAS VAN NAMEE,.....Pittstown.
JOHN E. WARREN, ...Troy.

1846–7.

JOHN A. E. ABBOTT,.....Waltham, Mass.
NATHANIEL F. ALLEN,.....Northboro, Mass.

NATHANIEL T. ALLEN,.....Medfield, Mass.
JAMES H. BALL,.....Nassau.
GEORGE L. BARKER,.....New Lebanon.
JOHN A. GOODWIN,.....Bridgewater, Mass.
JOHN HAMMOND,.....Crown Point.
T. CHARLTON HENRY,.....Syracuse.
THOMAS B. HEERMANS,.....Syracuse.
CHARLES M. HOLTON,.....Brunswick.
JOHN F. KIDDER,.....Syracuse.
GARDNER LANDON, JR.,.....Troy.
DANIEL MARBLE,.....Troy.
CHARLES D. ROSSITER,.....Brooklyn.
L. A. ROUSSEAU,.....Troy
J. DAYTON F. SMITH,.....Hamilton.
H. E. THAYER,.....Troy.
JOHN I. THOMPSON,.....Troy.

1847-8.

CHARLES S. ABBOTT,.....Bath, N. H.
THOMAS D. CAMMACK,.....New Orleans, La.
AUGUSTUS P. CHAMBERLAIN, A. B.,.....Salem, Mass.
HENRY CLUM,.....Brunswick.
D. CADY EATON,.....New Haven, Conn.
GEORGE H. EVEREST,.....New Lebanon,
WILLIAM B. GUERNSEY,.....Norwich.
BENJAMIN MARBLE,.....Troy.
W. HENRY MERRIAM,.....Troy.
JOHN J. MOFFATT,.....Stephentown.
JAMES NEAL,.....Portland, Me.
JOHN W. OSBORN,.....Watervliet.
DAVID B. PARSONS,.....Hoosick Falls.
A. B. STRAWBRIDGE,.....New Orleans, La.
J. A. SULLIVAN,.....Boston, Mass.
WILLIAM S. THOMAS,.....Norwich.
HENRY B. WARREN,.....Troy.

1848-9.

JOHN C. BELL,.....Roxbury, Mass.
RICHARD BLOSS, JR.,.....Troy.
CALVIN BUSH,.....Nassau.
W. O. CARPENTER,.....Troy.
BLOOMFIELD W. CASWELL,.....Herkimer.
HARVEY B. DAUCHY,.....Troy.
NATHAN DAUCHY,.....Troy.
JOHN EDSON,.....Bridgewater, Mass.
F. A. GOODNOUGH,.....Troy.
J. P. HOAG,.....Sandy Hill.

JAMES IRVINE, ...Kingsbury, Ala.
FRANCIS IRVINE, ...Kingsbury.
EDWARD R. JOHNSON, ...Albany.
JOHN N. MILLER, ...Niskayuna.
GEORGE A. MURDOCK, ...Brookline, Mass.
ACHILLES J. ROUSSEAU, ...Troy.
FREDERICK D. TATOR, ...Troy.
SAMUEL M. VAIL, ...Troy.
EDWARD WADE, ...Watervliet.
LOUIS H. WEAVER, ...Troy.
J. CLIFFORD YEAGER, ...Philadelphia, Pa.
LEWIS E. YORKE, ...Salem, N. J.

1849-50.

HORATIO AMES, JR., ...Falls Village, Conn.
JOHN E. BAKER, ...Schaghticoke.
HAMPDEN BUELL, ...Troy.
JOHN G. BUELL, ...Troy.
JAMES A. BURDEN, ...Troy.
CHARLES W. BURRAGE, ...Leominster, Mass.
AARON BURT, ...Syracuse.
H. M. CHASE, ...Plattsburgh.
O. W. CLARY, ...Syracuse.
HIRAM COLE, ...Kingsbury, Ala.
*SILAS T. COVELL, ...Troy.
THOMAS DAVIS, ...Templeton, Mass.
JACOB A. DIVER, ...Melrose.
WILLIAM L. DROWNE, ...Canaan.
J. D. FOUQUET, ...Plattsburgh.
JOHN M. FOUQUET, ...Plattsburgh.
EUGENE HODSON, ...Florida.
JOSEPH H. HOWARD, ...Brooklyn.
M. E. HUTTON, ...Troy.
SAMUEL L. IRISH, ...Chatham.
J. H. KNICKERBACKER, ...Schaghticoke.
JOHN M. LANDON, ...Nassau.
AUGUSTUS LANE, ...Key West, Fla.
JAMES R. LARKIN, ...St. Louis, Mo.
ALBERT L. LEE, ...Fulton.
HENRY LESTER, ...Syracuse.
ABIEL T. LOOMIS, ...Fulton.
A. W. MCMURRAY, ...Lansingburgh.
H. A. MIDDLETON, JR., ...Charleston, S. C.
GEORGE H. NETTLETON, ...Springfield, Mass.
RICHARD B. NOYES, ...Southport, Wis.
E. A. PUTNAM, ...Syracuse.
SIMON P. SCHERMERHORN, ...Mohawk.

C. E. DUDLEY TIBBITS,.....Troy.
AUGUSTUS W. TWING,.....Lansingburgh.
CHARLES H. WARREN,.....Pittstown.
CHARLES S. WARREN, ...Troy.
CHARLES WELLINGTON,.....Syracuse.
P. WHITE,.....Troy.
P. P. WINTERMUTE, ...Elmira.
WILLIAM E. YOUNG, ...New York.

1850-1.

*AUGUSTUS E. BABCOCK,.....Troy.
JAMES G. BALTON,.....Troy.
RIPLEY R. CALKINS,.....Avoca.
ABIJAH C. CURTIS,.....Great Barrington, Mass.
SAMUEL D. DAVIS, ...Troy.
JAMES A. EDDY, ...Troy.
TITUS E. EDDY, ...Troy.
CHARLES S. HICKS,.....Troy.
WILLIAM P. HUBBARD,..... .....Bangor, Me.
GEORGE T. LANE,.....Troy.
HORATIO LLOYD, ...Salem.
ALEXANDER C. LOW, ...Dover, N. H.
J. R. MALLARY,.....Troy.
HORACE MAXWELL, ...Louisville, Ky.
ROBERT E. MEYER,.....Troy.
GEORGE L. MOODY, ...Boston, Mass.
J. HENRY NICHOLSON, ...Buffalo.
JAMES G. PATTON, ...Brunswick.
*T. H. PIERCE, ...Williamsburg.
FREDERICK R. STOWE, ...Troy.
WILLIAM A. THOMPSON, ...Troy.
H. H. WARD, ... Brooklyn.
WILLIAM S. WILLIAMS, ...Syracuse.

1851-2.

DANIEL ATWOOD, ...Boston, Mass.
CHARLES H. BALLARD, ...Charlemont, Mass.
NATHANIEL T. BARTLETT, ...Plymouth, Mass.
GEORGE C. BELL, ...Amsterdam.
EDWARD H. BROWN, ...Syracuse.
JOHN OTIS BURT, ...Syracuse.
JOHN C. CLIFFORD, ...Buffalo.
FREDERICK W. COLEMAN, ...New York.
ISAAC D. FISHER, ...Boston, Mass.
NATHANIEL FISHER, JR.,.....Northboro, Mass.
EDMUND B. FRENCH,..... .....Troy.

JOB P. GRANT,.....Schaghticoke.
BRYAN GRANT, ...Schaghticoke.
GEORGE B. HUNT,.....Huntsville, Conn.
GEORGE E. KIMBERLY,.....Chicago, Ill.
JOHN H. LEAVITT, ...Charlemont, Mass.
JOHN H. MAXON, ...Adams.
SAMUEL MCCONIHE,.....Troy.
GEORGE H. MOON,.....Hillsdale.
REUBEN NICKERSON, ...Bangor, Me.
MYRON PLATT, ...Glens Falls.
DUANE SIMMONS, ...Glens Falls.
JAMES G. SMITH,.....Chicopee, Mass.
WALTER M. SMITH, ...Newark, O.
TENCH F. TILGHMAN, ...Oxford, Md.
EUGENE L. WILLIAMS,.....Syracuse.
PRESTON C. F. WEST,.....Philadelphia, Pa.
B. FRANKLIN WOODFORD, ...Mt. Morris.

1852-3.

ROBERT P. ADRIANCE,.....Poughkeepsie.
STEPHEN E. BABCOCK,.....Troy.
*EDWARD D. BARTON,.....Troy.
*JOHN P. BEACH,.....Troy.
MANNING C. BLACKSTONE, ...Adams.
OLIVER P. BUEL.....Troy.
ELIAS E. CORYELL,.....New Hope, Pa.
HEBER CRANE,.....Detroit, Mich.
CHARLES D. CURTIS, ...Adams.
BURR DAUCHY, ...Troy.
NEWTON EDDY,.....Waterford.
A. PARK HAMMOND,.....Rockville, Conn.
HENRY F. HAYWARD, ...Kingston, C. W.
ROMANUS HODGMAN,.....Chelmsford, Mass.
HENRY LOHNES,.....Schaghticoke.
*GEORGE A. MASON,.....Chicago, Ill.
G. W. MYLERT,.....Milford, Pa.
FRANCIS K. MIDDLETON, ...Charleston, S. C.
JOHN M. MOTT, JR.,.....Lansingburgh.
FRANKLIN A. MORSE, ...East Poultney, Vt.
MATTHEW P. MYERS,.....Troy.
WILLIAM P. OPENHEIMER, ...Ponce, Porto Rico.
M. PELTON,.....Syracuse.
CHARLES H. RICHARDS, ...Warrensburgh.
ALEXANDER H. SHARPE,.....Salem.
OVID T. SIMMONS, ...Saugerties,
CLEMENT H. SINNICKSON,.....Salem, N. J.
*JAMES S. THORN, ...Troy.

CORNELIUS L. TWING,.....Lansingburgh.
B. C. MCVICKAR, ...Chicago, Ill.
J. WATSON WEBB, JR.,.....New York.
J. WATSON WEBB, 2D, ...New York.
J. BECKWITH WEST, ...Washington, D. C.

1853-4.

JAMES BAPTISTE,... .....Troy.
HENRY F. BIRGE, ...Troy.
FREDERICK BRAEM,.....Poughkeepsie.
ROBERT T. BURNS,.....Toronto, C. W.
JOHN CAMP, JR., ...Norwalk, Conn.
EDWARD CAMPBELL,.....Niagara, C. W.
JAMES CARPENTER,.....Demorestville, C. W
JEROME M. CHAPMAN, ...Farmington, Ill.
H. S. CHATFIELD,.....New York.
HENRY S. CHURCH, ...Troy.
FREDERICK R. CURTIS.....New York.
FRANCIS C. DRAPER, ...Toronto, C. W.
LEBBEUS EGERTON, JR.,.....Troy.
BENJAMIN FRANKLIN,.....Lansingburgh.
BYRON F. FRISBIE, ...Watertown.
H. S. GATZMER,.....Philadelphia, Pa.
EDWIN R. GRIDLEY,.....Hudson.
JOSEPH GREER, ...New York.
J. L. HICKS,.....New York.
GEORGE P. B. HILL,.....New York.
EDWARD HARLESTON, ...Charleston, S. C.
WILLIAM W. HENRY,..... .....Grand Rapids, Mich.
EUSTIS HUGER,.....Fort Munroe, Va.
WILLIAM D. JARVIS,.....Toronto, C. W.
DAVID T. JENKINS,.....Vernon.
HAYWARD JONES,.....Troy.
WILLIAM P. KELLOGG,.....Lansingburgh.
CAROLAN J. KINSEY,.....Clifton Mills.
ANTONIO F. DE LACERDA,.....Bahia, Brazil.
ROBERT C. LAISDELL, ...Lansingburgh.
JOSEPH B. LIVINGSTON,.....Trenton, N. J.
GEORGE W. LYLE,.....Athens.
CHARLES MACGUIRE, ...West Troy.
G. ELLIOTT MACOMBER, ...Ballstown.
JOHN J. MACPHERSON,.....Charleston, S. C.
CHARLES W. MANN,.....San Francisco, Cal.
EDMUND H. MURNEY,.....Belleville, C. W.
AUSTIN B. PAIGE, ...Unity, N. H.
JAMES H. PLACE,.....Rochester, N. H.
WILLIAM D. POWELL, ...Niagara, C. W.

LONGWORTH POWERS, ...Florence, Italy.
CHARLES C. POPE,.....Syracuse.
CHARLES M. B. PRIOLEAU, ...Charleston, S. C.
MANUEL QUINTANA,.....Havana, Cuba.
WILLIAM RADENHURST, ...Toronto, C. W.
*WILLIAM A. ROBERTSON,.....Rahway, N. J.
JOHN ROFF, ...Watervliet.
CHARLES E. ROWLAND,.....Charleston, S. C.
JOHN W. ROSS,.....Troy.
GEORGE H. SANFORD, ...Ballston.
J. STERLING SMITH, ...Geneseo.
JAMES M. TYLER,.....Hillsdale.
ROBERT B. THURSTON, ...Huntington, L. I.
JAMES G. TRACY, ...Syracuse.
ARTEMAS WOOD,.....Lansingburgh.
E. H. WELCH,.....Lambertville, N. J.

1854–5.

JOHN A. ABERT, ...Washington, D. C.
ARUNA M. ADSIT,.....Troy.
GEORGE W. BOUTELLE, ...Bennington, Vt.
A. E. BROWNING,.....Trenton, N. J.
CHARLES D. BURRUS,..... .. ..West Troy.
JEHIEL W. CHENEY,.....Massena.
D. E. CORNELL,.....Hoosick.
BENJAMIN E. CRANE, ...Athens, Ga.
DAN. B. DORSEY,..... .....Watertown.
JOHN D. P. DOUW,.....Greenbush.
OLIVER B. FILLEY,.....Lansingburgh.
HENRY P. GERRISH,.....Newburyport, Mass.
G. R. GIDDINGS,.....Jefferson, O.
EDWIN R. GRIDLEY,.....Hudson.
CHARLES HARRIS, ...New York.
DEWITT C. HAYES, ...Watertown.
J. W. HEIMSTREET,.....Troy.
E. PEARCE HORNE,.....Milledgeville, Ga.
RICHARD HURLEY,.....Troy.
BENJAMIN F. JOHNSON, ...Belleville.
GEORGE P. JOHNSON,.....Plymouth, Mass.
CHARLES HENRY JONES,.....Reading, Pa.
BEVERLY R. KEIM, ...Reading, Pa.
WILLIAM S. KIMBALL, ...Lawrence, Mass.
BENTON L. KINGSBURY.....Towanda, Pa.
JOHN C. KINZIE, JR., ...Chicago, Ill.
ROBERT T. LUCE, ...Yonkers.
R. L. MAXON,.....Stowell's Corners.
FREDERICK G. MCKEAN,..... ....Baltimore, Md.

FREDERICK MERCUR,.....Towanda, Pa.
J. CALDWELL NEWTON,.....New York.
GEORGE PADDOCK,.....Watertown.
FREDERICK SHELLY,.....Troy.
THEODORE D. SELLECK,.....Norwalk, Conn.
WILLIAM C. STARR,.....Trenton, N. J.
*CLIFFORD STICKNEY,.....Chicago, Ill.
CHARLES A. STETSON, JR.,.....New York.
L. M. SWIFT,.....Cornwall, Conn.
CHARLES TEN EYCK,.....Schodack.
EGBERT TEN EYCK,.....Schodack.
THOMAS W. THURSTON,.....Huntington, L. I.
EDWARD A. TROTTER,.....New York.
ALBERTUS WEBB,.....Trenton, N. J.
WILLIAM D. WELLS,.....Troy.
MALCOLM E. WILLIAMS,.....Syracuse.

1855-6.

RICHARD L. ANNESLEY,.....Albany.
HILL BARKER,.....Bangor, Me.
R. M. BENEDICT,.....New York.
DAVID H. BUEL,.....Poughkeepsie.
I. TOWNSEND BURDEN,.....Troy.
W. F. CORNISH,.....Bethlehem, N. J.
WILSON CROSBY,.....———
GEORGE S. DAWSON,.....Albany.
RICHARD H. DOUGHTY,.....Troy.
RICHARD P. H. DURKEE,.....New York.
*THOMAS EATON,..... Troy.
WILLIAM GILBERT,.....Troy.
*CHARLES O. GRAY,.....Warrensburgh.
HENRY M. HELLER,.....Clintonville.
J. LAWRENCE HICKS,.....Flushing.
EMELIO M. HIDALGO,.....Cienfuegos, Cuba.
BARON HIGMAN,.....Newport, R. I.
THEODORE HUBBELL,.....Troy.
A. MAYOR LAWVERE,.....Freeport, Ill.
N. B. LORD,.....Nassau.
JAMES MACDONALD,.....Albany.
FRANCIS H. PARKER,.....Oswego.
V. A. PUGSLEY,.....Amenia.
HENRY REDMUND,.....Orange, N. J.
CARLOS E. SAUVALLE,.....Havana, Cuba.
DANIEL F. SCHENCK,.....Oswego.
JUSTINO NUNES DE SENTO-SE,.....Bahia, Brazil.
PLINEY T. SEXTON,.....Rochester.
ALEXANDER SMITH,.....Orange, N. J.

FRANCIS K. STEVENS, ... Poughkeepsie.
FREDERICK W. TRIPPE, ... Newark, N. J.
JAY WESTINGHOUSE, ... Schenectady.
THOMAS G. WOOD, ... Albany.

1856-7.

HENRY S. ADAMS, ... Chicopee, Mass.
FRANK P. AMSDEN, ... Scranton, Pa.
WILLIAM P. ANDERSON, ... Cincinnati, O.
MILTON S. BRADSHAW, ... Lansingburgh.
JAMES D. BUTLER, ... Groton, Mass.
WILLIAM B. CHAPMAN, ... New York.
DANIEL CARHART, ... Clinton, N. J.
JOHN B. CARPENTER, ... Wyoming, Pa.
EUGENE M. COPELAND, ... Fort Ann.
FRED F. DURAND, ... New York.
CYRUS F. EMERY, ... Mexico.
CHARLES R. FLOYD, ... St. Marys, Ga.
JAMES T. GARDNER, ... Troy.
HENRY F. GREENE, ... Syracuse.
CHAUNCEY E. IVES, ... Lansingburgh.
*THOMAS L. JOHNSON, ... Troy.
NATHAN N. KEELER, ... Salem.
T. ELLERY LORD, ... Albany.
WILLIAM G. MYERS, ... Canton, Miss.
DUDLEY OLCOTT, ... Albany.
JAMES H. PERRY, ... Troy.
M. S. PRUDHOMME, ... Opelousas, La.
ROBERT F. E. REDINGTON, ... Troy.
WILLIAM W. ROUSSEAU, ... Troy.
THOMAS ROWLAND, ... Alexandria, Va.
FRANCISCO R. SABAT, ... St. Johns, P. R.
JAMES C. STODDER, ... Boston, Mass.
JOHN H. TAYLOR, ... Newark, N. J.
EDWARD L. TOPP ..... Memphis, Tenn.
RUSH VANLEER, ... Nashville, Tenn.
ISAAC P. WODELL, ... Ellisburgh.
JOHN WYLIE, ... Iroquois, C. W.

1857-8.

ANTONIA S. CASANOVA, ... Cienfuegos, Cuba.
CHARLES H. DAUCHY, ... Troy.
CHARLES D. FISHER, ... Lansingburgh.
JAMES M. HAWLEY, ... Troy.
JOHN R. HALSEY, ... Newark, N. J.
GEORGE P. HERTHEL, ... St. Louis, Mo.
*EDGAR HORSEFALL, ... Schenectady.
STEWART IVES, ... Lansingburgh.
JORDAN W. LOCKWOOD, ... Martindale.

JOSEPH D. LOMAX,.....New York.
EDWARD T. MAIDMENT,.....Albany.
FRANCISCO A. PAYROL,.....Villa Clara, Cuba.
WILLIAM H. SCRANTON,.....Scranton, Pa.
JOHN H. STRADER,.....Cincinnati, O.
EDMUND L. TYLER,.....Norwich, Conn.
MARIN F. YZNAGA,.....Trinidad, Cuba.
HENRY W. BILL,.....Philadelphia. Pa.
ALBION W. CHRISTIE,.....Savannah, Ga.
CHURCHILL CRITTENDEN,.....San Francisco, Cal.
J. CALDWELL CROMBIE,.....Rochester.
EDGAR M. CULLEN, A. B.,.....Brooklyn.
HANFORD DAY,.....Lansingburgh.
E. T. EDDY,.....Troy.
*OTIS FISHER,.....Trenton, N. J.
LEONARD GOODWIN,.....Morris, Conn.
HENRY P. GREGORY,.....Plattsburgh.
WILLIAM H. GULICK,.....Blossburg, Pa.
FRANKLIN S. HALL,.....Fredericksburgh, Va.
MARSHALL HASTINGS,.....Benicia, Cal.
IRA HARRIS, JR.,.....Albany.
WILLIAM T. HART,.....Union Point, Ga.
WILLIAM B. HYDE,.....Benicia, Cal.
LLEWLYN M. KAUFMAN,.....Leesport, Pa.
JACOB LIPPMAN,.....Savannah, Ga.
GEORGE W. MILLER,.....Johnsonville.
JOSEPH RIDGWAY, JR.,.....New York.
AUGUSTUS SACKETT,.....Warren, Conn.
E. SHELDON SCRIBNER,.....Janesville, Wis.
ABRAHAM J. STORM,.....Stormville.
CHARLES F. TURNBULL,.....Charleston, S. C.
JAMES D. WARNER,.....Albany.
WILLIAM ZIMMERMANN,.....Buffalo.

1859-60.

HENRY M. ADAMS,.....Amherst, Mass.
*JOHN T. CARROLL,.....Troy.
*WALTER O. DUNBAR,.....Preble.
WILLIAM H. GILLETT,.....Buffalo.
NATHANIEL IRISH,.....Pittsburgh, Pa.
JAMES G. KNAP,.....Brownville.
GEORGE W. LANE,.....Franklin, La.
LEONARD MARCH,.....Bangor, Me.
REUBEN W. PETRIKIN,.....Lock Haven, Pa.
FRANKLIN C. PRINDLE,.....Arlington, Vt.
LEWIS Y. SCHERMERHORN,.....Greenwich.
THOMAS VAN VALKENBURGH,.....Lockport.

1860-1.

FRANCISCO E. ANIDO, ... Villa Clara, Cuba.
THOMPSON H. DOUGHTY, ... New York.
GEORGE B. HICKMAN, ... West Chester, Pa.
CHARLES McC. LORD, ... Lyme, Conn.
EDWIN C. MONCURE, ... Hinds Co., Miss.
J. LAWRENCE RATHBONE, ... Albany.
MORTIMER H. ROBERTS, ... Glens Falls.
NICHOLAS TANCO, ... Havana, Cuba.
SINCLAIR G. TURNBULL, ... Westchester.

1861-2.

MIGUEL DE AROSTEGUI, ... Puerto Principe, Cuba.
GEORGE H. BIERCE, ... Circleville, O.
EDMUND L. COLE, ... Troy.
THEODORE W. DAVIS, ... Poughkeepsie.
ARTHUR J. DILLON, ... St. Louis, Mo.
EDWARD H. HAMMOND, ... Waltham, Mass.
ANDREW S. HUGHES, ... St. Joseph, Mo.
WALTER JAMES, ... New York.
FREEBORN G. JEWETT, JR., ... Poughkeepsie.
ERVIN B. KENYON, ... Hoosick.
FREDERICK MASON, ... Taunton, Mass.
C. STEWART MORRIS, ... Sing Sing.
JOHN C. McMURRAY, ... Lansingburgh.
WILLIAM J. MYERS, ... Pittsburgh, Pa.
MONTAGUE P. NEFF, ... Cincinnati.
CHRISTOPHER L. PAINTER, ... Pittsburgh, Pa.
WILLIAM W. PARRISH, ... Philadelphia, Pa.
EDWARD R. SATTERLEE, JR. ..... New York.
CHARLES H. L. SMITH, ... New York.
WILLIAM WHEELWRIGHT, ... London, Eng.
GEORGE T. WICKS, ... Poughkeepsie.
THOMAS F. WITHERBEE, ... Port Henry.

1862-3.

FRANCIS BABCOCK, A. B., ... New York.
CHARLES W. BEEBE, ... Ravenswood, L. I.
JULIUS N. BEEMER, ... Newton, N. J.
JAMES BETTNER, ... Yonkers.
CHARLES E. BURRALL, ... Rock Island, Ill.
GEORGE O. CATLIN, ... Troy.
ROBERT S. CHURCH, ... Brooklyn.
CHARLES DAVISON, ... New York.
BERTRAM DELAFIELD, ... Staten Island.
JOHNSON L. DE PEYSTER, ... Tivoli.
ASAHEL EDGINGTON, ... Edgington, Ill.
S. DE PUY FREER, ... Cortland.

THOMAS GORDON, ...New York.
EDWARD M. GREEN,.....Troy.
CHARLES R. HICKS,.....Troy.
SAMUEL B. JUDAH, ...Vincennes, Ind.
JOHN F. MARSH, ...Chicago, Ill.
JAMES T. MUNN, ...New York.
GEORGE H. MUNSON, ...Amsterdam.
G. FREDERICK OLIVER,.....Troy.
ALEXANDER S. PALMER, JR.,.....Stonington, Conn.
MELVIN STEPHENS, ...Brooklyn.
PLOWDON STEVENS,..... Grafton.
ROBERT H. THOMPSON, ...Troy.

1863-4.

WHITFIELD B. ABBOTT,.....Fort Lee, N. J.
*EDWARD L. ARCHER,.....Brooklyn.
SATTERLEE ARNOLD,.....Sandlake.
FREDERICK A. APELLES, ...West Point.
JUSTO M. DEL CANAL, ... Pinar del Rio, Cuba.
PABLO B. CANTERO,.....Trinidad, Cuba.
GIDEON W. CARMICHAEL, ...Sandlake.
WILLIAM G. COCHRANE,.....New York.
WILLIAM H. COUGHLIN, ...Brooklyn.
WALTER E. COX,.....Bethlehem, Pa.
L. HUNTLEY CRAMER, ...Saratoga.
B. DALTON DORR,..... .....Philadelphia, Pa.
AUGUSTUS H. EATON,.....Troy.
FRANCIS W. ELSTON, ... Crawfordsville, Ind.
*ALFRED DE F. GALE,.....Troy.
CHARLES C. GERARD, ...Newburgh.
GUILLERMO P. GONZALEZ, ...Havana, Cuba.
NELSON J. HARRIS,.....Hamilton.
ALFRED W. HIGGINS, ... Buffalo.
CHARLES P. HOWELL, ...Goshen.
H. REEVE INGALLS, ...Troy.
AMASA C. JACKSON, ... New York.
J. ROSS JACKSON,.....Paterson, N. J.
GEORGE M. KING,.....Morristown, N. J.
WILLIAM KNIGHT, ...Yonkers.
J. HAMILTON LANGWORTHY,.....Stonington, Conn.
EDWARD H. MORRISON,.....Newark, N. J.
CHARLES W. MUSGRAVE,.....Bay Ridge.
JULIEN S. OGDEN, ...New York.
ROBERT E. PACKER, ...Mauch Chunk, Pa.
JUAN PEREZ, ...Consolacion, Cuba.
JOSE PONCE,.....Trinidad, Cuba.
GEORGE V. SHEPARD,.....Troy.

CHARLES L. SNOW, ... Brooklyn.
ORISON B. SMITH, ... Ravenswood.
N. HENRY STARBUCK, ... Troy.
*CHARLES UNDERHILL, ... Sing Sing.
DAVID H. VALENTINE, ... Greenpoint.
EUGENE VANDERPOOL, ... Newark, N. J.
*WILLIAM A. VANDERVOORT, ... New York.
FRANK WARREN, ... Louisville, Ky.
WILLIAM WATERS, ... Franklin.

1864–5.

*DIEGO A. DE AGUERO, ... Puerto Principe, Cuba.
GEORGE P. ATWILL, ... New York.
JOSEPH N. BALESTIER, JR., ... New York.
MILLS W. BARSE, ... Olean.
FRANK O. BENNET, ... Bellport.
FELIX A. CAMPUZANO, ... Matanzas, Cuba.
ALEXANDER H. CARYL, JR., ... Groton, Mass.
J. WAKEFIELD CORTLAN, ... Baltimore, Md.
FREDERICK S. COZZENS, ... Yonkers.
ANTONIO E. DESVERNINE, ... Havana, Cuba.
SAMUEL L. DOLSEN, ... Middletown.
FRANKLIN DWELLE, ... Rushville.
FERNANDO M. FIGUEREDO, ... Bayamo, Cuba.
TEOFILO GIMBERNAT, B. S., ... New York.
DAVID H. GOULD, ... Bergen.
J. LESLIE GREGG, ... Wilmington, Del.
ALBERT W. HUBBARD, ... Birmingham, Conn.
FREDERICK H. HUMPHREY, ... Auburn.
AMBROSIO D. LAMADRIZ, ... Matanzas, Cuba.
PEDRO MALIBRAN, ... Trinidad, Cuba.
H. FREDERICK MERWIN, ... Brooklyn.
MAXIMO E. MORA, ... Havana, Cuba.
LUIS M. MOREJON, ... Matanzas, Cuba.
JOSE R. NADAL, ... Mayagues, Porto Rico.
ANDREW ONDERDONK, ... Sherwood, N. J.
WORTH OSGOOD, ... Troy.
CARL F. PALFREY, ... Belfast, Me.
THOMAS O. B. POTT, ... Pottsville, Pa.
*ROBERT B. READING, ... Philadelphia, Pa.
CORNELIUS ROOSEVELT, ... New York.
CLINTON F. STEPHENS, ... Auburn.
WARNER UNDERWOOD, ... Bowling Green, Ky.
LEOPOLDO VALDES, ... Havana, Cuba.
WESLEY VANDERCOOK, ... Fremont, O.
CHARLES K. WEAD, ... Malone.

1865-6.

ROBERT W. ABORN, JR., ... Orange, N. J.
ROBERT F. ADAMS, ... New York.
RODOLFO ADAN, ... Puerto Principe, Cuba.
MOSES ATWOOD, ... Pittsburgh, Pa.
PHINEAS BARNES, JR., ... Portland, Me.
ANDREW BARRY, ... Hillsboro, O.
LEWIS L. C. BARTLETT, ... Providence, R. I.
THOMAS BRADFORD, ... New Brighton, Pa.
SAMUEL BRADY, ... Detroit, Mich.
EDMUND CANFIELD, ... Dover, N. J.
CHARLES G. COOPER, ... Mt. Vernon, O.
ST. CLAIR DENNY, ... Pittsburgh, Pa.
WILLIAM R. FREEMAN, ... New York.
ALEXANDER GRAY, ... Wilkesbarre, Pa.
ORRIN S. GRIDLEY, ... Buffalo.
GEORGE S. GUNNISON, ... Brooklyn.
EUGENE J. HALL, ... Brandon, Vt.
GEORGE B. HALL, ... Detroit, Mich.
GIDEON HAWLEY, ... Albany.
WILLIAM T. HULL, ... Philadelphia, Pa.
JOSIAH W. JENKINS, ... Vernon.
JULIUS J. LARRINAGA, ... San Juan, P. R.
WILLIAM N. LEE, ... Detroit, Mich.
GARDNER MACGREGOR, ... Mac Gregor, Ia.
FREDERICO J. MARQUETTI, ... Havana, Cuba.
THOMAS G. MCKELL, ... Chilicothe, O.
PABLO MENDIVE, ... Havana, Cuba.
THOMAS H. MITCHELL, ... Cincinnati, O.
RAIMUNDO NAVARRO, ... Monterey, Mex.
JOSE A. NUNEZ, ... San Juan, P. R.
WILLIAM G. PARK, ... Pittsburgh, Pa.
FRANK PLACE, ... Cincinnatus.
MATTHEW PRESTON, ... Pittsburgh, Pa.
MANUEL E. RIVAS, ... Matanzas, Cuba.
JAMES ROCKWELL, JR., U. S. A., ... Utica.
ARTHUR A. ROGERS, ... Utica.
GEORGE B. ROGERS, ... Williamsburgh.
JULIAN A. ROGERS, ... Utica.
ANTONIO SANCHEZ, ... Puerto Principe, Cuba.
WILLIAM SANDERSON, ... Milwaukee, Wis.
CHARLES W. SCHENCK, ... New York.
JESSE M. SMITH, ... Detroit, Mich.
JOHN W. TROTT, ... Niagara Falls.
HIRAM F. WILLIS, ... Eldred, Pa.
TEOFILO ZAMBRANO, ... Monterey, Mex.

1866-7.

CAETANO F. D'ALMEIDA,.....Rio Janeiro, Brazil.
JOAO J. ALVES, ...Bahia, Brazil.
WILLIAM D. BABER,.....Pottsville, Pa.
WILLIS H. BALLANCE, ...Peoria, Ill.
CHARLES J. BATES,.....Cincinnati, O.
ROBERT BELL, ...Rochester.
HENRY E. BROWN,.....Warren, Pa.
S. MATTHEWS CARY,..... .....Houlton, Me.
T. CHALMERS CLARKSON,.....Pittsburgh, Pa.
JAMES P. COLEMAN,.....Pemberton, N. J.
CORNELIUS M. COMEGYS.....Cincinnati, O.
EDWARD B. CRANE,.....Dorchester, Mass.
CLAY CRAWFORD,.....Cleveland, O.
HONORATO F. DE CUETO,.....Cienfuegos, Cuba.
WILLIAM H. FITCH,.....New Salem.
JOHN H. GARDINIER, ...Springfield.
THOMAS A. HAMILTON,.....Athens, Ga.
ARCHIBALD P. LAW,.....Carbondale, Pa.
SHERMAN H. LEROY,.....Staatsburg.
JUDSON MEDENHALL.....Lewistown, Pa.
EDWARD G. MORTON, ...Newburgh.
ALBERTO J. NADAL,.....Mayaguez, Porto Rico.
MERRITT PECKHAM, JR.,.....Utica.
FRANK J. QUEREAU,.....Brooklyn.
GEORGE TAYLOR, ...Fremont, O.
CHARLES H. THATCHER,.....Hartford, Conn.
ALEXANDER R. THOMPSON,.....Newark, N. J.
*FREDERICK TINKER,.....Newark, N. J.
GEORGE W. WORCESTER,.....Hollis, N. H.
SABAS J. ITURBIDE,.....Mexico, Mex.

1867-8.

SAMUEL H. ABY, JR.,.....New Orleans, La.
WILLIAM P. ALLENDORPH, ...Troy.
WILLIAM H. BARRY, ...Cincinnati, O.
JOHN W. BEAMAN, ...North Hadley, Mass.
RICHARD BLACKSTONE,.....Connellsville, Pa.
*ISAAC F. BOSWORTH, ...Troy.
ORIN S. BIXBY, ...Milford.
ROBERT C. P. COGGESHALL, ...New Bedford, Mass.
CHARLES L. DU BOIS, ...Washington, D. C.
WRIGHT GARDNER,.....Lansingburgh.
FRANK LINDSAY, ...Troy.
JAMES D. MASON, ...Providence, R. I.
ROBERT P. PAULDING,.....Cold Spring.

JOSEPH H. PETERS,.....Amesbury, Mass.
WILLIAM C. ROBERTS, ...Baltimore, Md.
GUSTAVE ROULLIER, ...New York.
HENRY G. SANDKUHL, ...Poughkeepsie.
CHARLES E. SAYLES,.....Elmira.
THOMAS E. VERMILYE, JR., ...Utica.
HARRY E. WOODROW, ...Cincinnati, O.
WILLIAM M. WOOLLETT, ...Watervliet.
CHARLES D. WRIGHT,.....Orwell, Vt.

1868-9.

WILLIAM A. ADAMS,.....Cincinnati, O.
ANTONIO A. AGUIRRE, ...Havana, Cuba.
JUAN P. ARRIOLA, ...Trinidad, Cuba.
JUAN B. BERRIOZABAL,.....Mexico, Mex.
PEDRO A. CARDONA,.....Manzanillo, Cuba.
LUCAS A. DE CASTRO,.....Trinidad, Cuba.
ALEXANDER C. CHENOWETH, A. B., ...Carlisle, Pa.
GEORGE B. CHENOWETH, A. B.,.....Carlisle, Pa.
STEWART F. CHISHOLM,.....Cleveland, O.
WILLIAM H. COFFIN, ...Washington, D. C.
CLARENCE L. COOK,.....Brooklyn.
MELVILLE CURTIS,.....West Farnham, C. E.
WENDELL R. CURTIS, ...East Abington, Mass.
MARK L. FILLEY, ...Lansingburgh.
EMILIO GIRO,.....Santiago, Cuba.
PEDRO F. HERNANDEZ, ...Matanzas, Cuba.
GEORGE C. JOHNSON, ...Brunswick.
LEOPOLDO DEL JUNCO.....Cieufuegos, Cuba.
FRANK R. KELLOGG,.....Ashland, O.
JAMES D. KETCHUM,.....Washington, D. C.
DOMINGO L. LAMADRIZ,.....Matanzas, Cuba.
GUSTAVUS A. LONGNECKER, ...Mechanicsburgh.
JOHN K. LONGNECKER, ...Mechanicsburgh.
ARTHUR MACARTHUR, ...Troy.
*HENRY R. MASSEY,..... .....San Francisco, Cal.
CHARLES E. PERKINS,.....Akron, O.
RAFAEL J. RUA,.....Matanzas, Cuba.
JOHN W. SINNICKSON, ...Salem, N. J.
MANNING L. SPOONER, ...Reading, O.
GEORGE M. THORNTON,.....Pawtucket, R. I.
WALTER F. UPSON, ...Tallmadge, O.
HOWARD S. WINSLOW,.....Cincinnati, O.
*CHARLES C WOODS,.....Washington, Conn.

1869-70.

FRANK P. ABERCROMBIE, ... Roslyn, L. I.
GEORGE S. ANDRUS, ... Brooklyn.
FRANK R. BLACKINTON, ... North Adams, Mass.
*WILLIAM B. CARROLL, ... Troy.
THOMAS CHARLTON, ... Ironton, O.
CHAUNCEY C. EDSON, ... New York.
FRANK A. FLETCHER, ... Indianapolis, Ind.
RAMON GUILLOT, ... Havana, Cuba.
JAMES P. HARRISON, ... Fayette, Miss.
WILLIAM HARRISON, ... Troy.
CHARLES A. INGRAHAM, ... Cambridge.
CHARLES C. KNEISLY, ... Dayton, O.
CHARLES M. MARSH, ... Woodstock, Vt.
CHARLES W. MCMASTER, ... Troy.
WILLIAM T. MILLER, ... Buffalo.
ALEXANDER G. PENDLETON, ... Washington, D. C.
EMILIO PRITCHARD, ... New York.
SOLON B. PRINDLE, ... Troy.
THOMAS J. RODMAN, JR., ... Rock Island, Ill.
EDWARD I. ROGERS, ... New Castle, Del.
ROSWELL D. SAWYER, ... Dover, N. H.
CHARLES H. SCHIMP, ... Allentown, Pa.
FRANCIS SHIPPEN, ... Burlington, N. J.
MICHAEL M. SHOEMAKER, ... Cincinnati, O.
EDGAR G. STONEY, ... Cedar Rapids, Ia.
GEORGE H. TILDEN, ... New Lebanon.
JOSE M. TRIBINO, ... Guayaquil, Ecuador.
CHARLES H. TUTTON, ... Tunkhannock, Pa.
G. NORMAN WEAVER, ... Newport, R. I.
EDWARD D. WELLING, ... North Bennington, Vt.
EDWIN L. WESTERMANN, ... Sharon, Pa.

1870-1.

SIDNEY W. BEAUCLERK, ... Louisville, Ky.
EDWARD D. BLACKWELL, ... Norristown, Pa.
RAFAEL DE CASTRO, ... Trinidad, Cuba.
GEORGE B. COE, ... Oxford.
HUGH COOPER, ... Mt. Vernon, O.
JOHN A. CORLISS, ... Waterford.
FRANK A. DICKSON, ... New Haven, Conn.
WILLIAM H. FLOYD, JR., ... St. Joseph, Mo.
HENRY GOOLD, ... Albany.
EDWARD T. GOULD, ... Troy.
WARREN GREEN, ... Louisville, Ky.
SAMUEL HALL, ... Evansville, Ind.
JOHN T. HALLIDAY, ... Brooklyn.
CHARLES M. HUBBARD, ... London, O.

S. Warren Ingalls,.....North Adams, Mass.
Eugene B. Jones,.....Washington, Mo.
John R. Kaley, A. B.,.....Albany.
Harry A. La Paugh, ...Utica.
Eugene S. Larkin,.....Bridgeport, Conn.
Joseph F. Lybrand,.....Philadelphia, Pa.
Jose Ygnacio Martinez,.....New York.
Walter P. McCulloch,.....Greenbush.
Edmund S. Mills, Jr., ...Hastings-upon-Hudson.
William R. Mygatt,.....Oxford.
William L. Otis,.....Cleveland, O.
G. L. M. Pinto, ...Rio Janeiro, Brazil.
*P. Porter Poinier,.....Newark, N. J.
John E. Robinson,.....Mt. Clement, Mich.
William H. Shirland,.....San Francisco, Cal.
Frederick W. Snow, ...Ramapo, N. Y.
Ethelbert A. Stanley, ...Schuylerville, Mendota, Ill.
*Floyd S. Thayer,.....Mendota, Ill.
Thomas W. Todd,.....Louisville, Ky.
Leslie J. Watson,.....Paterson, N. J.
Charles H. Wickham, ...Tioga, Pa.
Edward A. Wikidal,.....Canton, O.
George E. Winslow, ...Bay Ridge.
Thomas S. Wotkyns,.....Troy.

1871-2.

Samuel Alexander,.....Cohoes, N. Y.
Onward Bates, ...St. Louis, Mo.
Le Grand L. Benedict,.....New York.
Rudolphus R. Bourland, ...Peoria, Ill.
Julius R. Burnham,.....Glens Falls.
Samuel K. Cass, ...Pittsburgh, Pa.
Royal Chapin,.....Wickford, R. I.
Clancey R. Dempster,.....San Francisco, Cal.
Michael E. Devlin,.....West Chester.
Henry E. Drayton,..... .....Philadelphia, Pa.
Richard V. W. Du Bois,.....Hudson, N. Y.
Harry A. Elliott,.....Des Moines, Ia.
Warren Ewen, Jr.,.....Lima, Peru.
Franklin Field, Jr., ...Troy.
William D. Goold,.....Albany.
Edward B. Guthrie, A. B.,.....Buffalo.
Theodore W. H. Hauschild,.....Spragueville, Ia.
James A. Hutchison,.....Pittsburgh, Pa.
Charles H. King,.....Troy.
Joseph R. Kingsland,.....Franklin, N. J.
Frank T. Lane,.....New York.

*Charles McAlester,.....Florence, Ala.
Henry Mactier, ...Philadelphia, Pa.
Henry A. Parsons,.....Albany.
Overton Price, ...Hillsboro, O.
Gregorio C. Quesada,.....San Jose, C. R.
Jose de los Reyes, ...Lima, Peru.
Thornton E. Rodefer,..... .....Ballaire, O.
Patterson H. Rorer, ...Lynchburg, Va.
John H. Sollenberger,.....Louisville, O.
Robert S. Taylor,.....Staunton, Va.
William A. Tibbals,.....Hartford, Conn.
William Wheatley, Jr., ...New York.
Frank W. Whitlock, A. B., ...Great Barrington, Mass.
Frederick H. Wiggin,.....New York City.
Lyman C. Wilder, ...Hoosick Falls.
Albert M. Wilson,.....Brooklyn.
Jeu-ske Yamamoto,.....Bousheu, Japan.

1872-3.

W. Clinton Adams,.....Washington, D. C.
Frederick S. Bagley, ...Unadilla, Pa.
Clark S. Baily,.....Utica.
Tarleton Bates,..... .....St. Louis, Mo.
Joseph W. Burden, A. B., ...Troy.
Richard E. Chism, ...Norristown, Pa.
Robert C. Clapp,.....Fort Hamilton.
Frank M. Clarkson,.....Rochester.
*Edward H. Clarkson, ...Bennington, Vt.
Charles A. Draper,.....Sing Sing.
James G. D'Wolf,..... .....Bristol, R. I.
Louis H. Evans,.....Chicago, Ill.
Isaac P. Flagler,.....La Grange.
Paul A. Fleury, ...Upper Falls, Md.
Edgar Freedman,.....New York.
Francis C. Gamble,..... Toronto, C. W.
N. Audinet Gibert, ...New York.
Fred H. Goodrich, ...St. Paul, Minn.
John K. Hall, ...New York.
Willard Harley,.....New York.
William A. Langridge, ...Muscatine, Ia.
Jose J. C. Malcher,.....Para, Brazil.
Nestor J. Narvarte, ...Lima, Peru.
Gouverneur Ogden, ...Troy.
George F. Penfield, ...New Rochelle.
Arthur S. Potter, ...Adams.
E. Ogden Ross, ...Troy.

WILLIAM C. ROSS,.....Troy.
FREDERICK F. SCHEINER,.....Newark, N. J.
GEORGE P. SCRIVEN,.....Chicago, Ill.
DANIEL L. SLATAPER,.....Pittsburgh, Pa.
CHARLES M. SMITH,.....Hardwick, Mass.
WILLIS G. SMITH,.....St. Paul, Minn.
EDWARD A. SPILSBURY,.....Baltimore, Md.
JOHN B. UNDERHILL,.....New York.
EUGENE UNDERWOOD, JR.,.....St. Paul, Minn.
H. GLYDE WILKENS,.....Detroit, Mich.
GEORGE T. WOOD,.....Louisville, Ky.
GIRO YAMAOKA,.....Tokio, Japan.

1873-4.

WALTER F. BALDWIN,.....Columbia, S. C.
FRED A. BELKNAP,.....Erie, Pa.
JOHN A. BERKEY,.....St. Paul, Minn.
HENRY BLAKELY,.....St. Paul, Minn.
CHARLES P. BONNETT,.....New York.
GEORGE W. BOWMAN, JR.,.....Carlisle, Pa.
ALFRED F. BRAINERD,.....St. Albans, Vt.
STEPHEN L. BRECKENBRIDGE,.....Alton, Ill.
A. SCOTT BROWN,.....Erie, Pa.
STEPHEN C. BUSH,.....Waterford.
LYMAN N. CAREY,.....Flanders, N. J.
FRANK CARRYL,.....Franklin, N. J.
JOHN CHISLETT,.....Indianapolis. Ind.
RICHARD E. CHISLETT,.....Indianapolis, Ind.
GEORGE B. CORNELL,.....New York.
EDWARD COLLEY,.....Washington, D. C.
WALTER F. CROSBY,.....New York.
LOUIS H. DICKERMAN,.....Troy.
FRANK M. FABER,.....Pittsburgh, Pa.
EMANUEL S. GANS,.....Philadelphia, Pa.
EDWARD GIBSON,.....Yonkers.
VOLENTINE W. GRANGER,.....Toledo, O.
JAMES R. HIRST.....Philadelphia, Pa.
J. HOLABIRD HORTON,.....Chicago, Ill.
FRANK E. HOUSE,.....Houseville.
JOHN W. HUGHES,.....Sharon, Pa.
CARROLL HUTCHINS,.....Concord, N. H.
GEORGE E. INGERSOLL,.....St. Paul, Minn.
WILLIAM B. ISETT,.....Spruce Creek, Pa.
MERWIN S. H. JACKSON,.....Toledo, O.
OSCAR JERECKI,.....Erie, Pa.
ELIAS M. JOHNSON,.....Spuyten Duyvil.
GILBERT H. JOHNSON,.....Spuyten Duyvil.

W. NOBLE JONES, ...Savannah, Ga.
WILLIAM KEMP, JR.,.....Troy.
ALBERTO F. LARRIEU,.....Matanzas, Cuba.
HORACE W. MANN, ...Blue Rapids, Kan.
CHRISTIAN J. MCKEE,.....Pittsburgh, Pa.
CHARLES S. MCMULLAN,.....Cohoes..
J. MCNAUGHTON, JR., A. B.,.....Albany.
BENJAMIN B. NEWTON, JR., ...Brooklyn.
GEORGE A. NIXON,.....Covington, Ky.
JOHN J. O'HARA,.....Albany.
CHARLES C. ORMSBY,.....Waterford.
EDWARD A. PATTISON,.....Troy.
*WILLIAMS PROUDFIT,.....Troy.
FREDERICK S. RAND,.....Troy.
RICHARD D. RICHARD,.....Stamford, Conn.
GEORGE W. RIDGELY,.....Springfield. Ill.
A. T. SCOFIELD, ...Warren, Pa.
ALFRED P. SCULL, JR., ...Phœnixville, Pa.
MINOT M. SEYMOUR,.....Greenville, N. J.
JOHN G. SHACKLADY,.....West Brookfield, Mass.
FRANCIS B. SHEPHARD,.....Jerseyville, Ill.
HENRY C. SHOCK, ...Baltimore, M. D.
FRED P. SMITH, ...Waterford.
C. R. HERMAN SONNTAG, JR., ...Stapleton.
A. WILTON STEIGER,.....Washington, D. C.
WILLIAM H. STORRS, ...Scranton, Pa.
LINTON W. STUBBS,.....Monroe, La.
AGUSTIN TOVAR, ...Puno, Peru.
ALLEN UNDERWOOD.....New York.
ROBERT S. WALKER, ...Richmond, Ky.
GEORGE H. WARREN, ...Troy.
WILLIAM F. WATERS, ...Cambridge, M. D.
JAMES C. WHITON,.....Troy.

1874-5.

CHARLES M. ADDISON,.....Washington, D. C.
*JOHN BAUSCH,.....Rochester.
GEORGE W. F. BECK,.....Lexington, Ky.
WILLIAM BLEAKLEY, ...New York.
MAXIMILIAN F. BONZANO,.....Phœnixville, Pa.
CHARLES H. BOYER, ...Brooklyn.
MAURICE E. CLARK, ...New Orleans, La.
JUNIUS W. COBB,.....Cleveland, O.
JOSEPH E. GALIGHER,.....Cincinnati, O.
FERNANDO HERBOSO, ...Santiago, Chile.
CHARLES B. HEAD, ...Allegheny City, Pa.
ROBERT L. HOLLIDAY,.....Bell's Mills, Pa.

FRANK TURNER HOWARD, ...New Orleans, La.
HERMAN D. KAMPMANN, ...San Antonio, Texas.
FREDERICK S. LALLY, ...Lansingburgh.
LESLIE MCLEAN LONG, ...Wilkes-Barre, Pa.
GEORGE COLE MADDEN, ...Troy.
WALTER H. MILLER, ...Cincinnati, O.
JAMES K. MORRISON, ...Clifton, O.
HERSCHEL MULFORD, ...Millville, N. J.
JOHN B. H. O'REILLY, ...Dublin, Ireland.
HENRY H. POST, ...Oswego.
VICCUTE FELIX PAZOS, ...Lima, Peru.
EDWIN V. SIDELL, ...Brooklyn.
GEORGE T. SWANDALE, ...Greenville, S. C.
KUZUMA TAKASU, ...Tokio, Japan.
UJI TAKA TODA, ...Tokio, Japan.
WILLIAM T. TRAUD, ...New York.
HENRY WARDEN, ...Philadelphia, Pa.
GEORGE CLARKE WHITE, ...Saratoga Springs.
GEORGE WILLETT, ...Decorah, Iowa.

1875-6.

FRANKLIN L. BAPST, ...Buffalo.
JOHN T. BARNUM, ...Rochester.
*WILLIAMS BENNETT, ...New Bedford, Mass.
WILLIAM H. CAMPBELL, ...Manayunk, Pa.
DAVID T. CRAIGIE, ...Stamford, Canada.
*FREDERICK A. CROWLEY, ...Troy.
ARTHUR H. EDDY, ...Hartford, Conn.
JAMES A. FAIRLEIGH, ...Louisville, Ky.
FLOYD FERRIS, ...New York.
CHARLES FRIEDMAN, ...Milwaukee, Wis.
FRANCIS D. GAMEWELL, ...Hackensack, N. J.
CORTEZ JOHNSON GOODENOW, B. C. E., ...Evanston, Ill.
*CLARENCE HUBBARD HASCY, ...Albany.
CHARLES B. HEAD, ...Allegheny City, Pa.
DAVID HENDERSON, ...Troy.
VAN WYCK HEWLETT, ...Woodsburgh.
WILLIAM L. HOGEBOOM, ...Ghent.
JOHN JOHNSTON, ...Cooperstown.
ENOS W. LEAVENWORTH, ...Wilkes-Barre, Pa.
KAKICHI MITSUKURI, ...Tokio, Japan.
ERNEST VICTOR MURO, ...Havana, Cuba.
JOSE LUCAS MURO, ...Havana, Cuba.
HARRY EDSEL PARRISH, ...Wilkes-Barre, Pa.
JOAQUIN M. PLANA, ...Santa Clara, Cuba.
PEDRO PABLO REOSECO, T. E., ...Guadalajara, Mexico.
FRANCISCO S. RODRIQUES, ...New York.

JUAN ALBERTO DE SALLES,.....San Paulo, Brazil.
RICARDO SEGURA,.....Mexico City, Mex.
MARTIN J. S. SMITH,.....Louisville, Ky.
HARRY S. SQUIRES,.....Troy.
MIGUEL LERDO DE TEJADA,.....Mexico City, Mex.
HENRY S. TREHERNE,.....London, England.
HENRY WARDEN,.....Philadelphia, Pa.
RICHARD G. WIGHT,.....Port Chester.
WALTER V. WILLSON,.....Troy.
WEBSTER WOTKYNS,.....Troy.

1876-7.

WILLIAM BLEAKLEY,.....New York City.
LOUIS F. BODINE,.....Williamston, N. J.
LEOPOLDO A. CAMACHO,.....New York City.
WILLIAM C. COOPER,.....Troy.
CHARLES G. DOUW,.....Poughkeepsie.
VAN WYCK HEWLETT,.....Woodsburgh.
ELIAS J. HOCH,.....Allentown, Pa.
EDWARD M. IZARD,.....Troy.
ROBERT LISTON,.....Albany.
CHARLES MANLEY,.....Summit, N. J.
DANIEL E. MCANDREWS,.....Chicago, Il.
REES EVAN MCDUFFEE,.....Cincinnati, O.
JOSIAH MILLER,.....Salem, N. J.
STEWART S. NEFF,.....Bryn Mawr, Pa.
PEDRO BRAZIL PAULISTA,.....San Paulo, Brazil.
GEORGE A. RANDALL,.....Troy.
HARRY RYAN,.....San Antonio, Texas.
JACOB S. SULLIVANT,.....Boston, Mass.
DANIEL K. VALENTINE,.....Brooklyn.
*PARK VALENTINE,.....Bennington, Vt.
WILLIAM W. WALLACE,.....Plain, O.
WILLIAM F. WATERS,.....Cambridge, Md.
JONATHAN K. WEBSTER,.....Detroit, Miss.
EDWARD J. WHITFIELD,.....Albany.
CHARLES E. WILSON,.....Troy.

1877-8.

MANUEL BERGARA,.....Brooklyn.
WEST BISSELL,.....Rochester.
LUTHER BRIDGERS,.....Wilmington, N. C.
BYRON P. BROCKWAY,.....Topeka, Kan.
OAKLEY W. FERGUSON,.....Troy.
EDWARD L. FORD, Ph. B.,.....Springfield, Ill.
WILLIAM HERBAGE, JR.,.....New York Mills.

JOSEPH B. HYDORN,.....Troy.
LUIS G. JOHNSON,.....Medellin, U. S. of C.
NORMAN R. KELLEY,.....New York City.
JOHN S. KENNEDY,.....Chambersburg, Pa.
JOHN A. MORRIS,.....Troy.
DAVIS MCCLURE, JR.,.....Oakland, Cal.
JOAQUIM T. NOGUEIRA,.....Campinas, Brazil.
LOVELAND PADDOCK,.....Watertown.
NED A. PLUMMER,.....Brattleboro, Vt.
DONALD B. TOUCEY,.....New York City.
ANICETO YZNAGA,.....Santa Esperites, Cuba.

1878–9.

RICHARD M. BLATCHFORD,.....Fort Hamilton, L. I.
ALBERT N. BRIGGS,.....Coeymans.
BENJAMIN L. CRESS,.....Hillsboro, Ill.
FRANK D. CURTISS,.....Columbus, O.
GEORGE E. FITZGERALD,.....Venezuela, S. A.
GEORGE W. FRANK,.....Brooklyn.
GEORGE W. LOEBER,.....Beaver, Utah.
KWOK SHUI LOH,.....Canton, China.
JOSE B. MANZANILLA,.....Havana, Cuba.
HARRY K. MATTHEWS,.....Cincinnati, O.
JOSEPH A. MCCORD,.....Pittsburgh, Pa.
FRANCIS MORALES, JR.,.....Havana, Cuba.
WING CHUNG PAWN,.....Canton, China.
HENRY M. REYNOLDS,.....Eagle Bridge.
FRANKLIN RIDGELY,.....Springfield, Ill.
WILLIAM H. SAYLES,.....Corning.
JOSIAH O. STEARNS,.....Corning.
OGDEN H. TAPPIN,.....Potsdam.
CHARLES E. THOMPSON,.....Troy.
ROSS WINANS WHISTLER,.....Baltimore, Md.

1879–80.

*JOHN T. COCHRAN,.....Philadelphia, Pa.
HERBERT R. LATIMER,.....Wilmington, N. C.
JONN CURRY LEE,.....Pottsville, Pa.
CHARLES H. LEDLIE,.....Palatine Bridge.
WILLIAM C. MACDONALD,.....New York City.
GEORGE M. MCKINNEY,.....West Troy.
KENTOYNE DE RENNE,.....Savannah, Ga.
FERREIRA LUIZ DE L. SANTOS,.....San Luiz Maranhao, Brazil.
YUI TSIN SU,.....Canton, China.
JOHN H. VINCENT,.....Alliance, O.
ALANSON S. WATERMAN,.....West Troy.

1880-1.

GEORGE C. ADAMS,.....Troy.
CHUENG WOO CHEONG,.....Shanghai, China.
FREDERICK B. EMBICK,.....Williamsport, Pa.
HENRY L. FINCH,.....Glens Falls.
EDWIN F. GILLETT, ...Chicago, Ill.
JAMES J. HAMILTON, ...Allegheny City, Pa.
*CARLTON R. HAWKINS,.....East Hamburg.
ABRAM G. HOLMES, ...Pittsburgh, Pa.
EDWARD E. JENKINS,.....Charleston, S. C.
HORACE E. MCPHERSON,.....Philadelphia, Pa.
GUSTAVE A. SCHOLLE, ...New York City.
GEORGE H. STRADER, ...Ashtabula, O.
EDWARD E. SWEET,.....Albany.
EDSON THALIMER, ...Troy.
JAMES T. WILLSON, ...Troy.
YUNG FO WOO,.....Canton, China.
CHUNG QUAN YUN,.....Shanghai, China.

1881-2.

JOSE LIBORIO AGRAMONTE Y ZAYAS,.....New York City.
JAMES BURDEN,.....Troy.
WYLIE H. DU BOSE, ...Washington, Ga.
WILLIAM IMLAY FISKE, ...Trenton.
JAHN H. K. GREEN,.....Brooklyn.
GEORGE IRELAND,.....New York City.
WALTER M. JERMYN,.....Scranton, Pa.
EDWARD H. KENYON,.....Cleveland, O.
HENRY MCD. LORAIN,.....Troy,
FRANK S. MEAD,.....Knoxville, Tenn.
ATTILLES P. MORISINI, ...New York City.
RICHARD F. POWELL, ...Chicago, Ill.
CHARLES E. PRATT, ...Essex, Conn.
ABRAM O. REYNOLDS, ...Hoosick.
OLIVER RODGERS,.....Hanging Rock, O.
WALTER H. SEYMOUR,.....Troy.
NORMAN L. STAMM,.....Philadelphia, Pa.
JOSE F. DE VALLE, ...Maranhao, Brazil.
HUGO WEBER,.....New York.
FREDERICK H. YOUNG,..... Troy.

1882-3.

ROBERTO AGUIRRE,.... .....S. Luis Potosi, Mex.
MANUEL F. AGUAYO, ...Bayamon, Porto Rico.
FRANK E. ALLEN,.....Fair Haven, Vt.

HARRY F. ANDREWS, ...West Troy.
CHARLES E. BARTHELL,.....Troy.
GEORGE T. BLISS,.....Erie, Pa.
HOMER N. CAREW,.....Pleasant Valley.
WILLIAM B. CAREY,.....Salem, O.
JAMES L. COLWELL, ...Troy.
GEORGE A. DARBY, ...North Adams, Mass.
ALBERT F. DEMERS,.....Lansingburgh.
AUSTIN L. DICKINSON,.....East Haddam, Conn.
ENRIQUE DE GARAY,.....City of Mexico.
ANTOINE B. DU PONT,.....Louisville, Ky.
CHARLES B. ECKELS, ...Harrisburg, Pa.
ROBERT J. EVANS, ...Denver, Col.
GEORGE R. GRAFF,.....Blairsville, Pa.
PHILO D. HAMLIN,.....Mifflintown, Pa.
THOMAS T. H. HARWOOD, ...Detroit, Mich.
JOSEPH F. HEARNE,.....Wheeling, W. Va.
FREDERICK A. HOLROYD, ...Waterford.
EDWARD C. JUSTH,.....New York.
JAMES ERWIN LARROWE,.....Cohocton.
MARIO DE MENDONCA,..... .....Rio de Janeiro, Brazil.
GEORGE W. MILNES,.....Espy, Pa.
*JUAN F. MUNOZ DEL MONTE,.....Havana, Cuba.
WILLIAM NICHOLS,.....Albany.
GUY R. OVEREND,.....Philadelphia, Pa.
GEORGE H. PAINE, ...Englewood, N. J.
WALTER B. PRICE,.....Jefferson City, Mo.
JOHN RAUM,.....Washington, D. C.
GREEN B. RAUM, JR.,..... .....Washington, D. C.
EDWARD W. SCOTT, JR.,.....Lockport.
GEORGE C. SPAFFORD, ...Rockford, Ill.
WALTER S. TRIPP,.....Scranton, Pa.
DAVID ZIELEY, JR.,.....,.....Canajoharie.

1883-4.

WILLIAM E. ALLEN, ...New London, Conn.
HENRY R. ASSERSON, ...Norfork, Va.
ROBERTO DE S. BARROS,.....San Paulo, Brazil.
JOSE BASCARAN, ...Porto Rico.
JAMES H. BLAIR, ...Pittsburgh, Pa.
ROBERT L. BLAKEMAN,.....Danville, Ky.
GEORGE S. BLISS,.....Green Island.
ELISHA K. CAMP,.....Washington, D. C.
ROBERT E. CHAMBERS,.....New Glasgow, N. S.
SENIOR S. COOK,.....Averill Park.
WILLIAM H. CRUMP,.....Pittsburgh, Pa.
H. BURT DIXON, ...Buffalo.

ELLSWORTH L. EDWARDS,.....Pottsville, Pa.
ANDREW R. ELLIOTT,.....Keene, N. H.
GEORGE M. GRISWOLD,.....Louisville, Ky.
GEORGE M. HALL,.....Troy.
SAMUEL B. HATCH,.....Washington, D. C.
EDWIN Q. LASELL,.....Troy.
THOMAS W. MACCONNELL,.....Pittsburgh, Pa.
JOSE F. MALDONADO,.....City of Mexico.
ANTONIO NOGUEIRAS,.....Washington, D. C.
WALTER W. PEARS,.....Pittsburgh, Pa.
OCTAVIO A. PUYANA,.....Bucardmanga, U. S. C.
HERMAN ROSENTRETER,.....Hoboken.
WINIFRED S. RUSSELL, JR.,.....Philadelphia, Pa.
JULIUS C. SCHREIBER,.....Hoboken, N. J.
SUTTON E. SCOTT,.....Pittsburgh, Pa.
NAOJI SHIRAISHI,.....Tokio, Japan.
FRED A. SMITH,.....Bath.
FRANCIS C. TROWBRIDGE,.....Glendale, O.
MARION TWIGGS,.....Augusta, Ga.
WILLIAM C. WILLIAMS,.....Hollidaysburgh, Pa.

1884-5.

CHARLES E. BONNER,.....Deer Lodge, M. T.
WILLIAM E. BRISBIN,.....Lewistown, Pa.
BERNARDO J. BUENO,.....St. Jago, Cuba.
ROBERT W. BRUCE,.....Pittsburgh, Pa.
JOHN M. CUNNINGHAM,.....Leavenworth, Kan.
GEORGE D. DEMERS,.....Troy.
CHARLES S. EASTON,.....Peoria, Ill.
WILLIAM S. EMERY,.....Lansingburgh.
HUGH FLEMING,.....Allegheny, Pa.
THEODORE R. GEER,.....Brooklyn.
FLORENTINO GONZALEZ,.....Guayaquil, Equador.
JOHN L. GRETHER,.....St. Louis, Mo.
RUSH N. HARRY,.....Bedford, Pa.
ADOLPH HOEHLING,.....Washington, D. C.
CHARLES H. JUUD,.....Hawaiian Islands.
DAVID B. LEMON,.....Hollidaysburg, Pa.
WILLIAM J. LEWIS,.....Pittsburgh, Pa.
CHARLES T. LUCE,.....New Bedford, Mass.
CHARLES MCDOWELL,.....Philadelphia, Pa.
FRANK J. MCGREEVY,.....Quebec, Canada.
JOHN C. MOORE,.....Red Hook.
ROBERT H. PAUL,.....LaCrosse, Wis.
WALTER W. NORTON,.....Lakeville, Conn.
WILLIAM F. PATTERSON,.....Morristown, N. J.
FRANCIS P. PEALE,.....Philadelphia, Pa.

LEWIS P. PENNYPACKER,.....Westchester, Pa.
JUAN F. POEY,.....Havana, Cuba.
WILLIAM G. PRESTON,.....Buffalo.
JULE EUGENE ROEMHOLD,.....Chicago, Ill.
WILLIAM HUBLEY POTTER,.....Lancaster, Pa.
SUTTON E. SCOTT,.....Pittsburgh, Pa.
ROBERT W. SMART,..... .....Troy.
*FRED A. SMITH,.....Bath.
GEORGE R. SNOAD, ...Chicago, Ill.
CHARLES F. TAYLOR,.....Mooers.
JOHN HUNTING THOMPSON, ...Unionville, Conn.
ALFREDA DA S. TORRES,.....Jaraguay, Brazil.

1885-6.

WILL HARRY ARNOLD,.....Pittsburgh, Pa.
WILLIAM D. CARD,.....Pittsburgh, Pa.
GURDON G. EVERTSON, ...Albany.
T. DE G. FINNEY,.....Memphis, Tenn.
JOHN M. HODGEN,..... .....St. Louis, Mo.
LAWRENCE M. MARTIN,..... .....New Orleans, La.
ALLAN MCL. MOWRY, ...New York.
EDWARD L. RICHARD,.....Montgomery, Ala.
EDWARD M. WILKINS,.....Baltimore, Md.

OFFICERS AND MEMBERS

OF THE INSTITUTE,

JANUARY 1, 1887.

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E. THOMPSON GALE, C. E. (1860)
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JOSEPH C. PLATT, JR., C. E. (1882)
ELIAS P. MANN, C. E. (1882)
STEPHEN W. BARKER, M. E. (1886)
ROBERT W. HUNT. (1886)
CHARLES W. TILLINGHAST. (1886)
HENRY G. LUDLOW. (1886)
HENRY B. DAUCHY. (1886)
MAYOR OF TROY, *ex officio.*

† Date of election.

FACULTY AND INSTRUCTORS.

HON. WILLIAM GURLEY, C. E., ACTING PRESIDENT. (1886)†

DAVID MAXSON GREENE, C. E., DIRECTOR. (1878)
Professor of Geodesy, Road Engineering and Topographical Drawing.
Instructor 1855-56; Professor 1856-61.

CHARLES DROWNE, C. E., A. M. (1876)
Emeritus Professor of Theoretical and Practical Mechanics.
Assistant and Adjunct Professor 1847-51; Professor 1851-55; Senior Professor 1859-60; Director and Professor 1860-76.

JAMES HALL, A. B. (r. s.), A. M., LL. D., N. Y. STATE GEOLOGIST. (1876)
Emeritus Professor of Thereotical, Practical and Mining Geology.
Professor 1835-41; Professor 1854-76.

DASCOM GREENE, C. E. (1857)
Professor of Mathematics and Astronomy.
Instructor 1852-53; Assistant and Adjunct Professor 1853-57.

HENRY BRADFORD NASON, PH. D., M. D., LL. D. (1864)
Professor of Chemistry and Natural Science.
Professor of Natural History 1858-64.

DWINEL FRENCH THOMPSON, B. S. (1873)
Professor of Descriptive Geometry, Stereotomy, and Drawing.
Assistant Professor, 1872-73.

PALMER CHAMBERLAINE RICKETTS, C. E. (1884)
William Howard Hart Professor of Rational and Technical Mechanics.
Assistant 1875-82; Assistant Professor 1882-84.

WILLIAM PITT MASON, C. E., M. D. (1885)
Professor of Analytical Chemistry.
Assistant 1875-82; Assistant Professor 1882-85.

RICHARD HALSTED WARD, A. M., M. D. (1869)
Professor of Botany.
Instructor 1867-69.

† Date of appointment.

CHARLES WELLMAN PARKS, C. E. (1886)
Acting Professor of Physics.
Assistant 1885-86.

CHARLES WINTHROP CROCKETT, A. B., C. E. (1884)
Assistant Professor of Mathematics and Astronomy.

JULES GODEBY, A. B. (1873)
Instructor in the French Language and Literature.

FRANK LEWIS NASON, A. B. (1882)
Instructor in the English Language, and Assistant in Mathematics.

JOHN HALL EMIGH, C. E. (1883)
Assistant in Mathematics and Geodesy.

WILLIAM WARREN CUMMINGS, C. E. (1884)
Assistant in Technical and Rational Mechanics.

ROBERT ANDREW CAIRNS, C. E. (1885)
Assistant in Descriptive Geometry and Drawing.

AUGUSTUS SAYRE KIBBE, C. E. (1886)
Assistant in Geodesy.

GEORGE WARREN WORCESTER. (1886)
Special Student; Assistant in Mathematics.

MEMBERS OF THE INSTITUTE,

JANUARY 1, 1887.

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COURSE IN CIVIL ENGINEERING.

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JOHN ANDREW CLARK, ...Wilmington, Del.
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JOSE MANUEL YZQUIERDO,.....Havana, Cuba.

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GEORGE WARREN WORCESTER, ...Troy, N. Y.

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John Alfred Kimberly, ... Neenah, Wis.
Charles Kirschner, ... Troy, N. Y.
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Julio Sylvester Moliner, ... Havana, Cuba.
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Francis Winthrop Scarborough, ... Cincinnati, O.
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Seuchi Tokito, ... Tokio, Japan.
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Guy Bennett Waite, ... Bloods, N. Y.
James Berry Williams, ... Washington, D. C.
Theodore Henry Williams, ... L'Anse, Mich.

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Laurin Dewey Clark,.....Iowa City, Ia.
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Charles Forman, ... New Orleans, La.
Alfred Ginebra,.....Brooklyn, N. Y.
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Herbert Armstrong Jaggard,.....Altoona, Pa.
Edwin Seton Jarrett, ...Buffalo, N. Y.
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Ignacio Dublan Montesinos, ...City of Mexico.
Allan Neilson,.....Williamsport, Pa.
Charles Morton Parker,.....St. Louis, Mo.
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SHERMAN WICKLIFF BELDING,.....Pittstown, N. Y.
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WILLIAM EDWARD CARLIN,.....Ft. Omaha, Neb.
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JOHN CONSALUS, JR.,.....Troy, N. Y.
JOHN CAULDWELL CORLISS,.....Troy, N. Y.
NORMAN WHEELER CRAMP,.....Philadelphia. Pa.
LEWIS DEMMING DAVIS,.....Lansingburgh, N. Y.
LOUIS TEETZEL DAY,.....Troy, N. Y.
GEORGE CHAUNCY DEWEY,.....Wheeling, W. Va.
EDOUARD DE ROCHA DIAS,.....Bahia, Brazil.
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JAMES WHEELER FLEMING,.....Troy, N. Y.
ARTHUR BROWN GARDENER,.....Bennington, Vt.
CARLOS ALBERTO GASTEAZORO,.....Chuandega, Nic.
RICHARD DAVID GOTTLIEB,.....Chicago, Ill.
BERTRAND EUGENE GRANT,.....Troy, N. Y.
JOHN WILLIAM HENKELMAN,.....Baltimore, Md.
MURREY INNES,.....San Francisco, Cal.
ANTONIO LLANO,.....Medellin, U. S. C.
ARTHUR BERNARD MADER,.....Cincinnati, O.
WILLIAM HENRY MANNING,.....Saratoga, N. Y.
ARTHUR VAN ALLEN MCHARG,.....Albany, N. Y.
CHARLES METCALF,.....Pittsburgh, Pa.
LIBERTY GILBERT MONTONY,.....Troy, N. Y.
ERNEST CURTIS MOORE,.....Atlanta, Ga.
RICARDO PORRO,.....Santiago, Cuba.
RANDOLFO PENNA, JR.,.....Rio de Janeiro, Brazil.
HUGH HARRY PITCAIRN,.....Harrisburg, Pa.
CHARLES SCHILLER POHLY,.....Albany, N. Y.
CHARLES AUGUSTUS RAHT,.....Philadelphia, Pa.

WILLET GEORGE RANNEY,.....Cleveland, O.
K. OAKE P. REINHOLDT, ...Newcastle, Pa.
CHARLES AUGUSTUS ROEMER,.....Lansingburgh, N. Y.
PAUL LOUIS SCHULTZE, ...Hoboken, N. J.
JAMES WILSON SHIELDS,.....Mt. Pleasant, Pa.
REEVES SMITH, ...St. Joseph, Mo.
ARTHUR JARVIS STONE,.....Waterford, N. Y.
TARO TSUJI,.....Tokio, Japan.
WILLIAM GRANT WHITLOCK,.....Chicago, Ill.
ROBERT HENRY WILLIS, ...Omaha, Neb.
ROBERT ZIEGENFELDER, ...Piqua, O.

SPECIAL STUDENTS.

WALTER GOWAN HOTCHKISS,.....Buffalo, N. Y.
JOHN RECTOR MCCOMB, ...Troy, N. Y.
WILBUR FISKE SMITH,.....Wheeling, W. Va.

JAMES MAXWELL WILLSON, ...Hastings, Neb.

Special student and Assistant in Mathematics. Completed the course in Civil Engineering to receive the degree of C. E. at Commencement, 1887.

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Gregg, J. Leslie..... 1864
Gregory, Henry P..... 1858
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Greene, Henry F..... 1856
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McDuffee, Rees Evan..... 1876
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McKinney, George M..... 1879
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Moon, George H..... 1851
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Morales, Francis Jr..... 1878
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Munn, James T..... 1862
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Myers, John K..... 1830
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Noyes, Richard B..... 1849
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Paige, Austin B..... 1853
Paine George H..... 1882
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Palfrey, Carl F..... 1864
Palmer, Alexander S., Jr..... 1862
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Parker, Francis H..... 1855
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Patton, James G..... 1850
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Paulista, Pedro B..... 1876
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Pawn, Wing Chung..... 1878
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Pope, Charles C..... 1853
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Powers, Albert E..... 1830
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Preston, William G..... 1884
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Prindle, Solon B..... 1869
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Pugsley, V. A..... 1855
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Reoseco, Pedro P..... 1875
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Rua, Rafael J 1868
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Ryan, Harry..... 1876
Sabat, Francisco R..... 1856
Sackett, Augustus..... 1858
Salles, Juan Alberto de..... 1875
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Sandkuhl, Henry G..... 1867
Sanford, George H..... 1853
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Sargent, James T..... 1845
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Schanck, Charles W..... 1865
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Schreiber, Julius C..... 1883
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Scofield, A. T..... 1873
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Segura, Ricardo..... 1875
Selleck, Theodore D..... 1854
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Seward, George W..... 1826
Sexton, Pliny T..... 1855
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Shacklady, John G..... 1873
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Sharpe, Alexander H..... 1852
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Shepard, George V..... 1863
Shephard, Francis B..... 1873
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Sherrill, James H..... 1841
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Smith, J. Dayton F..... 1846
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Smith, Joseph O..... 1835
Smith, J. Sterling..... 1853
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Smith, Orison B..... 1863
Smith, Walter M..... 1851
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Smith, Willis G..... 1872
Snoad, George R..... 1884
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Snow, Frederick W..... 1870
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Spilsbury, Edward A..... 1872
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Squires, Harry S..... 1875
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Starr, William C..... 1854
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Steiger, A. Wilton..... 1873
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Stephens, Melvin..... 1862
Stetson, Charles A. Jr..... 1854
Stevens, Francis K..... 1855
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Stickney, Clifford..... 1854
Stodder, James C..... 1856
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Su, Yui Tsin..... 1879
Suffern, James A..... 1835
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Talbot, Josiah M..... 1830
Tanco, Nicholas..... 1860
Tappin, Ogden H..... 1878
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Taylor, Charles..... 1884
Taylor, George..... 1866
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Taylor, Stoughton N..... 1836
Ten Eyck, Charles..... 1854
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Thatcher, Charles H..... 1866
Thayer, Asa P..... 1830
Thayer, Floyd S..... 1870
Thayer, H. E..... 1846
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Thompson, Alexander R..... 1866
Thompson, Charles E..... 1878
Thompson, John I..... 1846
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Thompson, Robert H..... 1862
Thompson, William A..... 1850
Thomson, John..... 1828
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Thornton, George M..... 1868
Thurston, Robert B..... 1853
Thurston, Thomas W..... 1854
Tibbals, William A..... 1871
Tibbits, C. E. Dudley..... 1849

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Tilden, George H..... 1869
Tilghman, Tench F..... 1851
Tillinghast, Thomas A..... 1835
Tinker, Frederick..... 1866
Toda, Uji Taka..... 1874
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Topp, Edward L..... 1856
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Toucey, Donald B..... 1877
Tovar, Agustin..... 1873
Tracy, Charles C..... 1830
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Trand, William T..... 1874
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Tribino, Jose M..... 1869
Trimble, James M..... 1824
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Trippe, Frederick W..... 1855
Trott, John W..... 1865
Trotter, Edward A..... 1854
Trowbridge, Francis C..... 1883
Turnbull, Charles F..... 1858
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Tuttle, Charles F..... 1828
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